PAINT and VARNISH Production

THE TECHNICAL MAGAZINE FOR MANUFACTURERS OF PAINT, VARNISH, LACQUER AND OTHER SYNTHETIC FINISHES

NEWPORT

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JULY
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MEK is the Number One low-boiling active solvent for both nitrocellulose and vinyl lacquers. Leading formulators have found that MEK cannot be replaced directly by any other solvent without loss in quality or increase in cost.

MEK is one of the Shell "quality group" of solvents, which includes—among others—MIBK, MIBC, and IPA. Your Shell Chemical representative will be happy to discuss the advantages to be gained from using MEK in your formulations.

MEK

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(Established in 1910 as The Paint and Varnish Record)

VOL. 43 JULY, 1953 NO. 7

NEXT ISSUE

The next issue of PAINT and VARNISH PRODUCTION will carry an article dealing with the engineering aspects of vehicle manufacturing equipment. Three broad categories will be discussed—Unit Operation, Mechanical Design and Construction, and Operation of Equipment.

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Editorial Comment

Keeping Cool

At a recent conference of the Society for the Advancement of Management in New York, Dr. Lucien Brouha of the Du Pont Haskell Laboratory of Industrial Toxicology described some very interesting research he is doing to learn causes of fatigue and to develop ways of making jobs easier.

He pointed out that years of research has established the fact that increases in an individual's pulse rate and temperature following muscular exertion and the time it takes these reactions to start back toward normal levels can be relied upon to measure the amount of physical stress caused by work and fatigue it is apt to induce. Thus, said Dr. Brouha, "it is possible for the physiologist to evaluate and classify many industrial jobs according to fatigue potential."

With the throes of the summer heat upon us, Dr. Brouha passed along some very timely and worthwhile recommendations for alleviating fatigue in hot and humid weather. He pointed out that in some jobs fatigue can be reduced substantially by lowering heat and humidity, by increasing ventilation, and by evolving a schedule of rest periods adequately spaced and of sufficient duration. He further stated that when high heat and humidity in the plant cannot be remedied, satisfactory physiological recovery cannot be achieved unless workers rest at regular intervals in an air-conditioned room where temperature and humidity are controlled at comfortable levels.

"Failure to drink plenty of cool water in hot weather promotes fatigue and, moreover, a man's thirst is not a reliable indicator of how much water he needs," Dr. Brouha emphasized.

Physiological tests have been used to determine amounts of water required to replenish body fluids lost through perspiration. Workers then have trained themselves to drink fixed amounts at regular intervals, much as a sick man with fever "forces" liquids. As a matter of fact, men working in hot areas who did not drink enough water were found to run temporary "fevers" of 100 deg. F and higher.

In connection with replacing salt lost through perspiration, Dr. Brouha reported that abundant salting of food is preferred than the use of salt tablets.

Interior Paint Preference

THE New York Vehicle Manufacturers Group has come up with some very interesting figures regarding preferences of interior paint in the Metropolitan area.

This group found that in 1952 gloss enamels consisted of 20% of the paint sales in the New York area, semi-gloss—15%, and flats—65%. In checking sales figures for 1948, they found that gloss enamels amounted to 50% of sales, semi-gloss—5%, and flats—45%.

It is obvious that the trend in home decorating is away from high gloss finishes, and the preference for flats can be attributed to the availability of such finishes with washability and odorless features, and the tremendous consumer consumption of water emulsion paints, which grabbed off 45%of interior paint sales last year.

When to Paint?

THE Canadian Government's building division recently released a statement to the effect that a fall paint job will last longer than a spring job. The reason being that during the heat of the summer the process of oxidation and polymerization of the vehicle progresses much more rapidly than during the fall and winter months. Consequently deterioration commences much earlier.

It was found that paint applied in the early spring loses its gloss appreciably during the summer months, and white lead house paints deteriorated much more rapidly from a spring application as compared with a fall application. Regarding erosion of paint films, one company discovered that an application in May and consequent weathering to September of the same year was equivalent to one year of weathering when compared with a September to September period.

With the rainy springs, we have been experiencing during the last couple of years causing paint sales to dip considerably, it may not be a bad idea for paint manufacturers to start now a vigorous campaign for fall painting stressing the longer-lasting angle.

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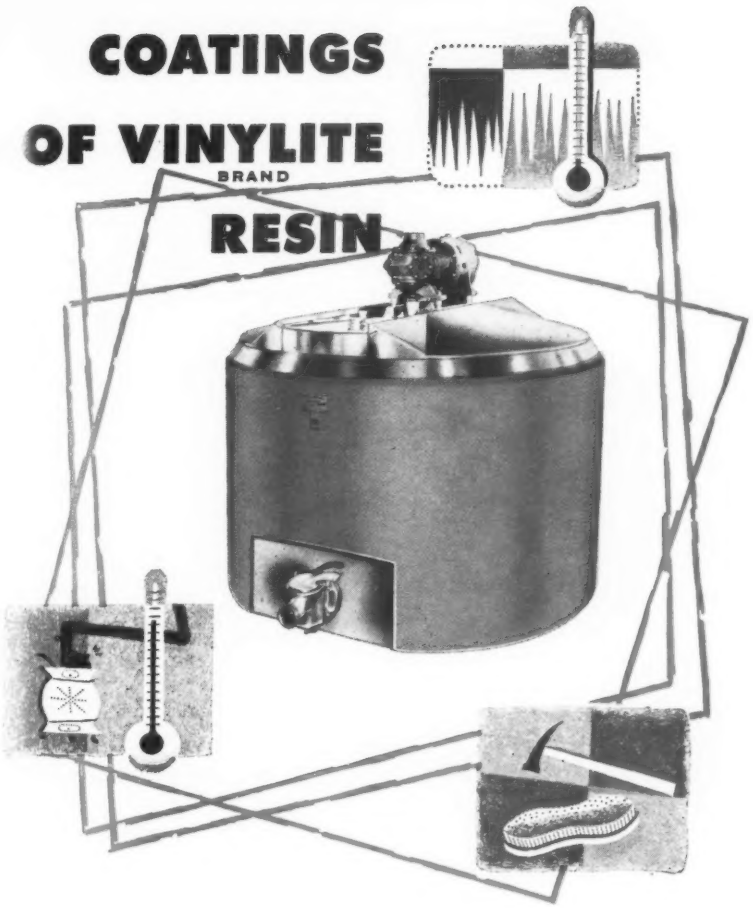

with the give that can take it!

MILK PROCESSING equipment and similar equipment subject to rapid heating and cooling must have coatings with a high degree of flexibility. That's why formulators rely on coatings based on VINYLITE Brand Resins. They "move" with the surface, expanding and contracting as needed... adhering tenaciously.

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VINYLITE Resins usually give the flexibility and durability you need to formulate better coatings for dairy equipment, tank cars, oil refineries, marine installations, industrial plants... wherever surfaces are exposed to rough treatment, wide temperature changes, chemicals, industrial gases.

Write Dept. QF-75 for folder giving case histories of severe coating applications.

Illustrated is round milk processor made by Cherry-Burrell Corporation, Chicago 6, Ill., and coated with VINYLITE Resin coatings in Cherry-Burrell Blue. Coatings prepared by Stoner-Mudge, Inc., Pittsburgh 33, Pa.

Case Histories Prove Performance

BAKELITE Resin Floor Varnish—Floor finishes based on BAKELITE Resins provide extreme wear resistance that minimizes maintenance costs. A typical case history has been the gymnasium floor of the Sewickley (Pa.) High School—subject to rough daily service from basketball and other events—even school dances. Yet, four years after being coated with an air-drying varnish based on BAKELITE Resin, it still maintained its lustrous surface. No touch-up had been needed, either. And, the stripes and markings applied before the BAKELITE Resin coating were just as sharp and new-looking as when applied.

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Structural Finishes for Corrosion-Erosion Resistance—*Another example of how well BAKELITE Resins solve difficult coating problems was the painting of structural steel work on river locks and dams in the Monongahela River. Acid pollution and flow of silt had developed a serious combination of costly corrosion and erosion. Reports stated "ordinary paints are of little value in preventing corrosion and erosion under the conditions described." After seven years' research and testing, the engineers in charge determined that pigmented BAKELITE phenolic resin coatings were superior to any other for this use.*

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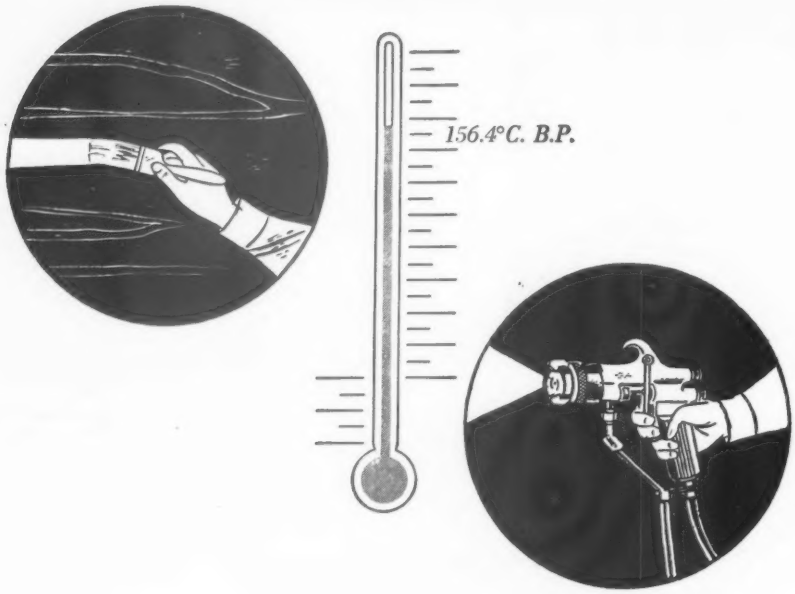

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30 East 42nd Street UCC New York 17, N. Y.

Physical Properties of "CELLOSOLVE" ACETATE

FORMULA $CH_3COOC_2H_4OC_2H_5$

Molecular Weight	132.16
Specific Gravity	0.974
Boiling Point, °C. at 760 mm. Hg	156.4
Vapor Pressure, mm. Hg at 20° C.	1.2
Flash Point, °F. (Cleveland Open Cup)	150

The term "Cellosolve" is a registered trade-mark of Union Carbide and Carbon Corporation.

the chemist's page

Formulating with Nuade cuts grinding costs for odorless flats

Nuade and its advantages:

Chemists can now reduce milling costs in odorless alkyd flats by formulating with Nuade, our patented roller mill grinding aid. Laboratory tests of these odorless systems demonstrate that Nuade increases output as much as 140%, thereby saving production time and dollars.

Further tests, described in a new laboratory bulletin available on request, show excellent results with four basic classifications of pigment-vehicle paste systems including both good and poor wetting vehicles, easy and hard-to-wet pigments.

How Nuade works:

Nuade temporarily increases the tack of the paste to minimize slippage and provide more rapid, complete transfer of the ground paste to the next grinding surface. Successful use in millions of gallons of paint proves that Nuade is neutral and non-reactive—does not affect the finished product.

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We'll gladly send you complete data on our laboratory runs with odorless flat and other systems and an easy-to-use tube of Nuade (enough for 10 to 20 laboratory batches). Write today to Nuodex Products Co., Inc., Elizabeth, N. J.

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PHILLIPS 66 SOLTROL* 170
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End Point	450°F
Kauri Butanol Number	23

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ODORLESS MINERAL SPIRITS

SOLTROL*

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PHILLIPS PETROLEUM COMPANY
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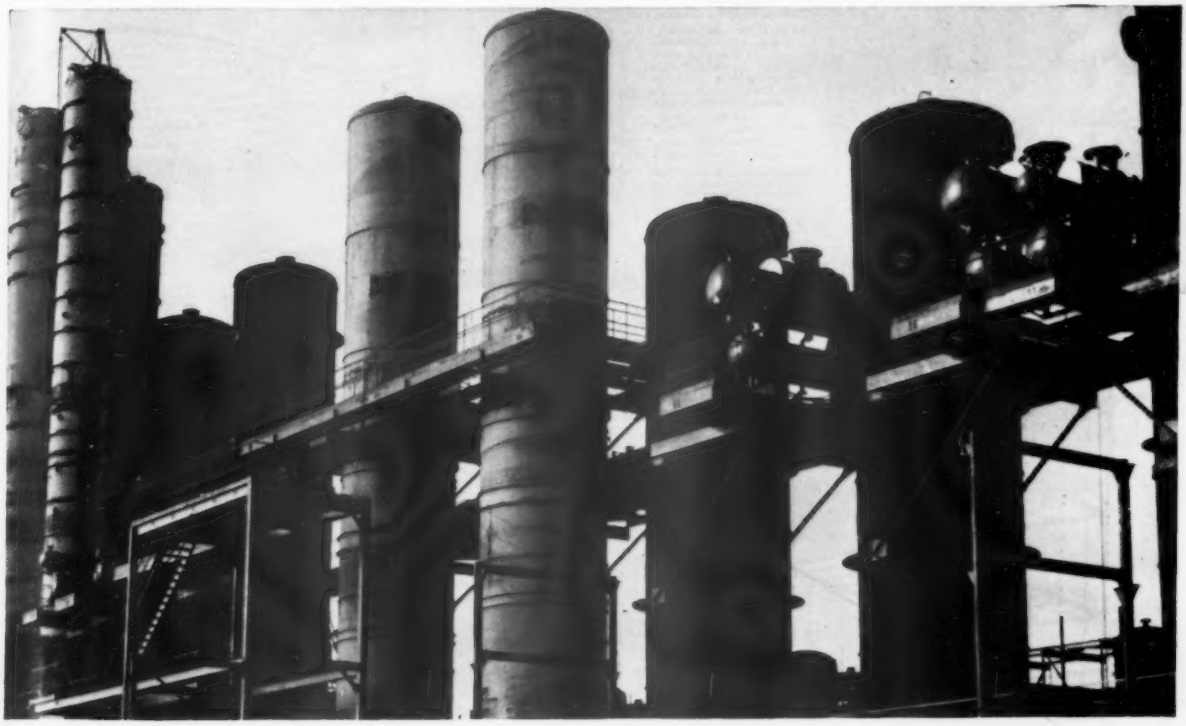
BARTLESVILLE, OKLAHOMA

DOW

DOW BUILDS NEW FACILITIES FOR VINYLTOLUENE PRODUCTION

New DOW monomer offers properties of special interest to users of styrene. Quantities now available for development work



Another new monomer is ready to take a major position with other Dow monomer "firsts" that are playing important roles in industry. Dow's new plant for the full-scale production of vinyltoluene will be completed this year and will be in production early in 1954.

Priced to match the economies of styrene, vinyltoluene offers many new properties of special interest to members of the resin industry working with rubber reinforcing resins, styrenated oils and alkyds, styrene butadiene copolymers and polyester resins.

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DOW

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ARMOUR CHEMICAL DIVISION

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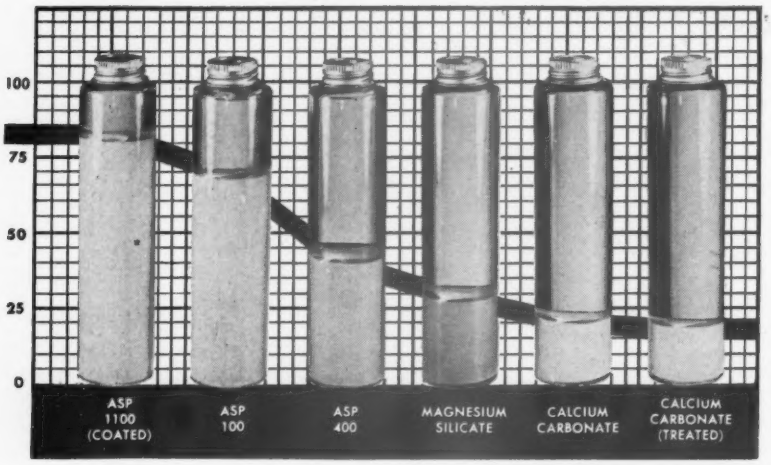

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"There is no quick, simple method of forecasting the suspension qualities of inerts in any given vehicle. Direct observation is the most desirable and accurate."

This was the principle behind the tests to determine the suspension qualities of inert pigments, tests that lasted a full 14 months.

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As evidenced by this picture, Edgar ASPs show much finer and higher suspension qualities than any of the other inerts tested.

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All have been manufactured in our most modern equipment.

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Uniform, High Quality

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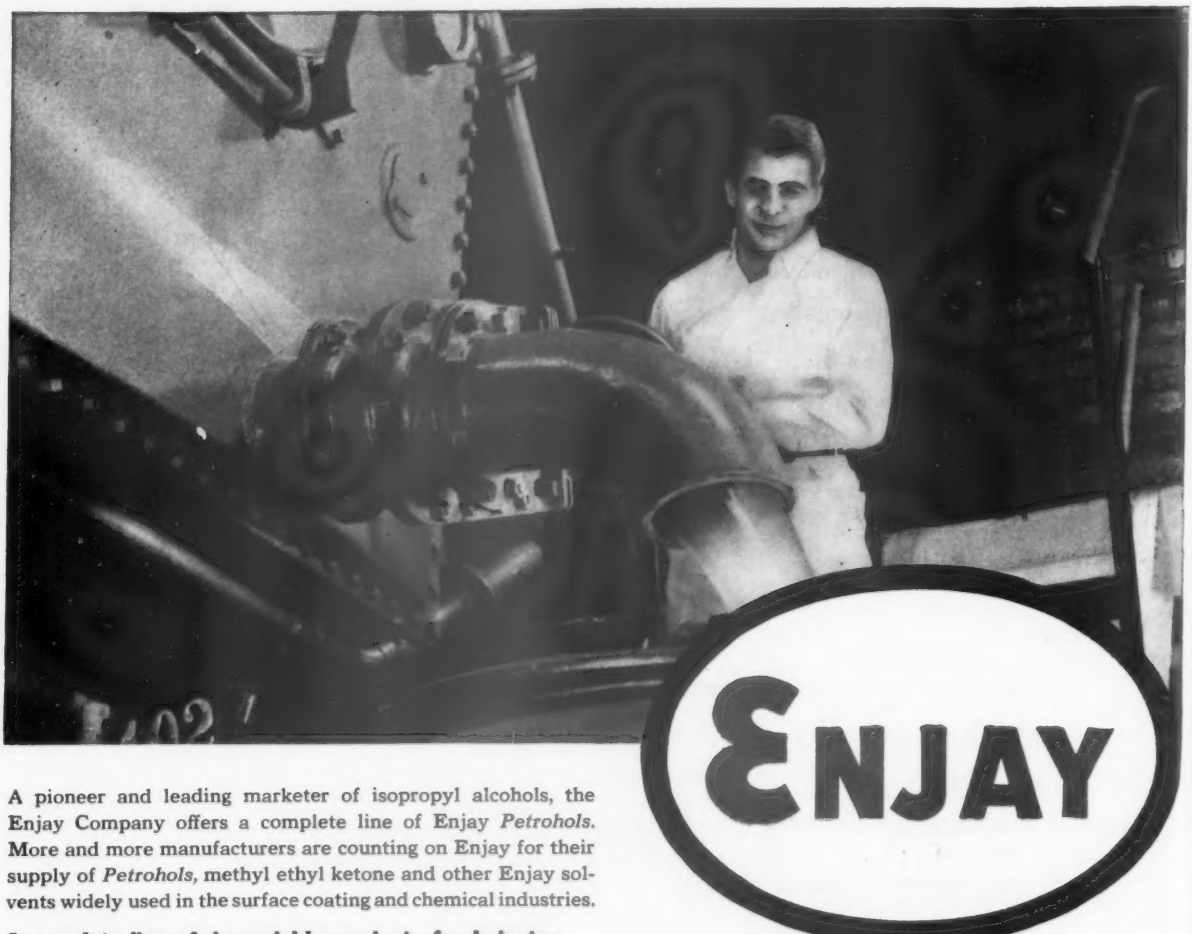

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A pioneer and leading marketer of isopropyl alcohols, the Enjay Company offers a complete line of Enjay *Petrohols*. More and more manufacturers are counting on Enjay for their supply of *Petrohols*, methyl ethyl ketone and other Enjay solvents widely used in the surface coating and chemical industries.

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PETROHOL 99
Secondary Butyl Alcohol
Secondary Butyl Acetate
Isopropyl Acetate
Acetone
Methyl Ethyl Ketone
Ethyl Ether
Isopropyl Ether
Dicyclopentadiene
Naphthenic Acids
Iso-Octyl Alcohol
Decyl Alcohol

CHEMICAL

PETROHOL 91
PETROHOL 95
PETROHOL 99
Iso-Octyl Alcohol
Decyl Alcohol
Tridecyl Alcohol
Dicyclopentadiene
Isoprene
Butadiene
Ethyl Ether
Isopropyl Ether
Tripropylene
Tetrapropylene
Aromatic Tars
Acetone
Methyl Ethyl Ketone

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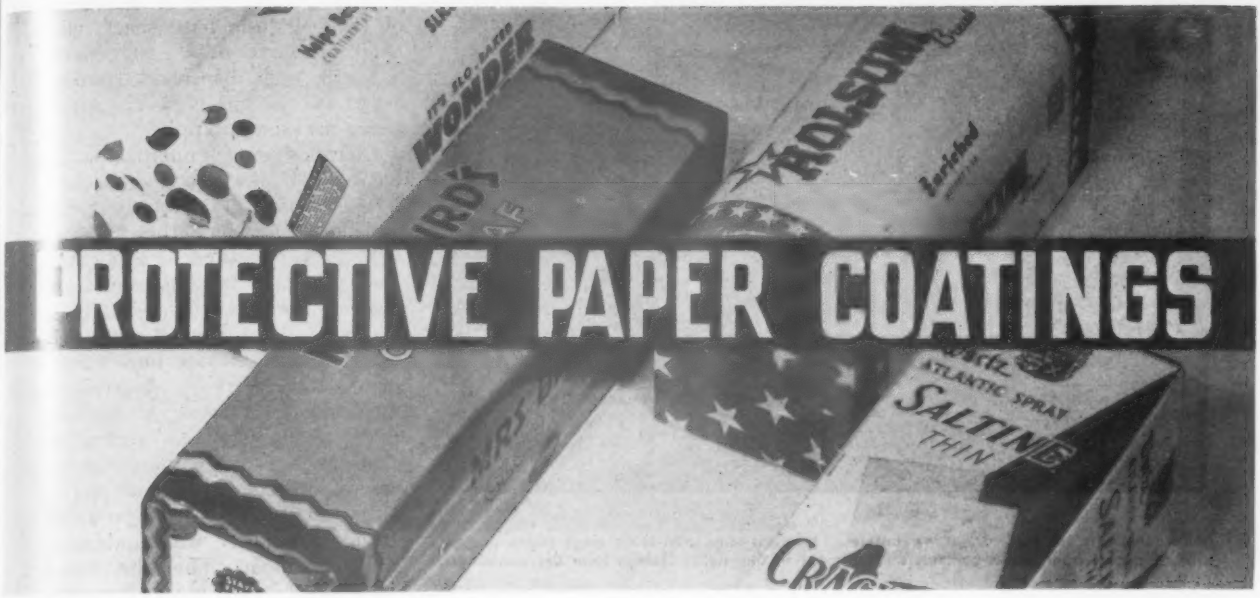


PROTECTIVE PAPER COATINGS

By D. W. DAVIS
G. W. FORCEY
J. F. HELMS

Paper coatings applied primarily for protection are discussed as to chemical types, application, coating properties and end uses. Base papers are selected to meet use requirements and must be adapted to the lacquer, hot melt or dispersion coating to be applied. Dispersion coatings are gaining in popularity as coatings are improved, because of low viscosity and ease of application.

Petroleum waxes continue to dominate for hot melt coatings, supplemented by polyethylene or ethyl cellulose where special property requirements justify the higher cost. Rubber and synthetic elastomers are used to impart strength and adhesiveness to coatings. The vinyl polymers are widely used in addition to cellulose nitrate for lacquer coatings. Comparative newcomers are the polyamide and polyester resins—some of which are thermosetting. Economic factors determine the selection of coatings from the many types available, depending upon end use demands.

THE PAPER industry has long followed the practice of modifying and augmenting the properties of paper by means of coatings. It is possible to improve decorative and functional properties to adapt papers to many types of uses. Various materials and techniques have been applied and a wide variety of coating materials developed. Any classification of coatings is somewhat arbitrary and the classes tend to overlap. However, for the purposes of this discussion we shall classify coatings as follows:

Classes

Coatings for Improvement of Surface

The earliest use of coatings was essentially an extension of tub sizing technique and employed pigments in combination with a binder to give increased surface smoothness for improvement of printing qualities. Other properties such as whiteness, opacity, gloss, water resistance, and scuff resistance are also sometimes obtained. Such coatings have been applied both on the paper machine and as a subsequent operation on special coating machines. These materials are usually applied from a water medium, followed by drying and usually calendering.

Coatings for Protection

As the uses of paper extended, particularly into the packaging field, there was need for papers with special functional properties, chiefly protection against moisture, grease, gas, insects, and microorganisms. Other desired qualities were increased mechanical strength, heat sealability, gloss, and scuff resistance. In order to supply these properties, it was necessary to use coatings containing film forming materials capable of giving a continuous film on the surface of the sheet. It is these protective coatings, their characteristics, and methods of preparation that will be discussed.

Base Papers

A discussion of coatings would be incomplete without some con-

This article is a contribution of the Converted Products Research Laboratory, Marathon Corp., Menasha, Wis.

Courtesy of The Bakelite Co.

Milk containers are made by using tasteless, odorless and non-toxic vinyl resins to coat rolls of papers from which containers are die-cut in the flat. Dairies form the containers.

sideration of the base sheets to which they are applied. Base sheets are selected for such properties as strength, stiffness, opacity, and transparency. In selecting a coating material for application to a sheet, consideration must be given to the surface smoothness and, particularly, the absorbent nature of the paper. Coatings with high viscosity can be applied successfully to the rougher, more open types of papers. Low viscosity coatings of the lacquer type require a dense base to avoid penetration of coating into the sheet. A smooth dense sheet requires less coating to form a continuous film and gives a surface of higher gloss. However, it is generally more difficult to anchor coatings to dense sheets. Water-base coatings often give difficulty during application, due to curl or weakening of the sheet prior to drying.

Coating Formulation

The ingredients of a coating composition may be prepared for application in three different ways depending upon the nature of the materials and the application method to be used:

Solution Method

One of the earliest methods was to dissolve the ingredients in a suitable volatile solvent, or combination of solvents — usually liquid organic compounds. The evaporation of the solvent then deposits the coating in a film on the base sheet. Such coatings are usually called lacquers or varnishes.

Hot Melt Method

A very common method consists in applying the coating in molten condition at elevated temperature. The coating is then set by cooling. Hot melt coatings may be viscous and difficult to apply, but they avoid the cost of solvent loss or recovery, and the problem of removing residual solvent.

Dispersion Method

An increasing number of coatings are being prepared for application by dispersion in some liquid in which they are insoluble. If water is the dispersion medium, the coating formulation is called a latex, hydrosol, or sometimes an emulsion. The coating is set by evaporation of the water, followed by fluxing of the coating at elevated temperature if necessary to form a continuous film.

Some coating ingredients may be dispersed in an organic solvent in which they are insoluble. Such coatings are called organosols.

In a few cases it has been found practical to use a liquid plasticizer as the dispersing medium. After application to the sheet, the coating is fluxed at elevated temperature to incorporate the plasticizer and form the final composition. Such coatings are referred to as plastisols. It should be noted that the necessity of using high temperatures may be a disadvantage by causing dehydration of the cellulosic base sheet, with resultant brittleness. In general, lacquers and dispersion coatings avoid excessively high viscosities, hence are easy to apply.

Coatings are formulated on the basis of (1) the selection of properties desired, (2) the materials which will produce these properties, (3) the method of application best suited to the base sheet and coating, and (4) the cost. The components of the coating composition may include film formers or elastomers, resins, plasticizers, and waxes. Coating formulation is a highly complex technology and practices vary with different manufacturers, although the results obtainable with given materials are fairly well understood and classified. The film former is usually the most important component of a coating composition. This discussion is therefore limited to known film formers as they are used in paper coatings.

Waxes

Wax is, by far, the most widely used material in protective coatings for paper. In late years over half a billion pounds of wax have been used annually either alone or as modifying agents for coating materials. Although the general term wax includes animal, insect, vegetable, and mineral waxes, the mineral waxes from petroleum are of principal interest. Petroleum waxes may be subdivided into two classifications; (1) paraffinic and (2) amorphous or microcrystalline.

Paraffin Wax

Paraffin wax has long been used in coatings to give moisture-proofness. This property is desired in such items as breadwrappers; frozen food overwraps; ice-cream, butter, and milk cartons; and protective wrappers for many non-food items. Paraffin coatings are also heat sealable, nontoxic, and they provide protection against flavor loss or gain. They are low in cost and easy to apply.

Microcrystalline Wax

The microcrystalline waxes are generally tougher, more ductile, and provide better adhesion than paraffin wax. The higher melting point fractions offer improved blocking and scuff resistance. The

Courtesy of the Hercules Powder Co.

Coating paper on Martison Knife Coater.

lower melting fractions are soft, tacky materials, flexible at low temperature, and suitable for use as laminating agents. They also have good sealing strength.

Because of their individual properties, greater versatility is obtained by blending crystalline and microcrystalline fractions to fit specific requirements. New types and sources of microcrystalline wax are constantly appearing and interest in their use continues to grow.

Cellulosic Derivatives

A study of cellulosic film formers indicates that their order of importance to paper converters is: cellulose nitrate, ethyl cellulose, cellulose acetate and cellulose acetate-butyrate. The remaining cellulosic materials such as benzyl cellulose and cellulose propionate are of lesser interest.

Cellulose Nitrate

Cellulose nitrate is the oldest of the synthetic plastics, dating back 117 years to the work of the French chemist, Braconnot. It was not until 1869 that the material was obtained as a solid mass — the forerunner of celluloid which pioneered the plastics industry. Films of cellulose nitrate alone are not suitable as paper coatings but, when modified with plasticizers, resins, and waxes they may produce coatings with improved flexibility, scuff resistance, gloss, heat sealability, and water vapor resistance. These coatings are relatively low in cost.

Cellulose nitrate coatings are generally applied from solution. Although emulsions are available, they have not proved practical, mainly because of inadequate moisture resistance. Cellulose nitrate is used in coatings where moisture-proofness, heat sealing, and high gloss are desired. These coatings are generally applied to regenerated cellulose glassine, and label papers. Despite the development and increasing use of many new synthetic resins, cellulose nitrate coatings continue to hold an important place in the paper coating field.

Ethyl Cellulose

Ethyl cellulose is of great interest in hot melt coatings because of its compatibility with plasticizers, resins, and waxes and its low softening temperature (330-390°F.). Its solubility in many organic solvents also makes it adaptable for lacquer formulation.

The proper choice of plasticizers produces coatings with improved low-temperature flexibility and the selection of resins imparts gloss and increased resistance to abrasion. Antioxidants may be used advantageously to prevent discoloration and embrittlement in coatings subjected to extended periods of exposure to heat and light. Ethyl cellulose is used in high gloss coatings, heat sealing adhesives and in other paper coatings requiring light fastness, scuff resistance, grease resistance, water vapor resistance, and washability.

Development is now under way on the manufacture and utilization of finely divided ethyl cellulose for hydrosol and organosol coating operations. This makes it possible to apply dispersions of high solids content with low viscosity and without the necessity of handling flammable solvents or high viscosity hot melts. The importance of ethyl cellulose in the hydrosol type coatings has yet to be proved by large scale application.

Cellulose Acetate

Cellulose acetate was developed about the turn of the century during the search for a material less flammable than cellulose nitrate. Cellulose nitrate and acetate are closely related in physical properties. Whereas cellulose nitrate decomposes upon heating, the acetate softens over the temperature range of 435-480°F. The acetate exhibits limited compatibility with plasticizers, resins, and waxes, a characteristic which hinders modifications for improving water-vapor resistance and adhesion to the base sheet. High softening temperature of cellulose acetate does not lend itself to the formation of heat-sealing coatings. Finely divided cellulose acetate resins have also been developed for dispersion type coatings, but they have not been used sufficiently to determine their importance.

The high permeability of cellulose acetate coatings to gases and water vapor is a desirable property for the packaging of certain fresh food products where respiration requirements must be met.

Cellulose Mixed Esters

The mixed ester, cellulose acetate-butyrate, has a lower softening temperature than cellulose acetate, thereby permitting its use in hot melt coatings. The odor of the ester restricts its use in food packaging. It is also somewhat higher in cost than cellulose acetate. So far, its use has been limited to coatings for decorative purposes.

Cellulose acetate-propionate is another mixed ester with lower softening temperature, slightly better water-vapor resistance, and lower water absorption than cellulose acetate; but it has more odor. Benzyl cellulose has also been investigated, but it has never been used in large quantities.

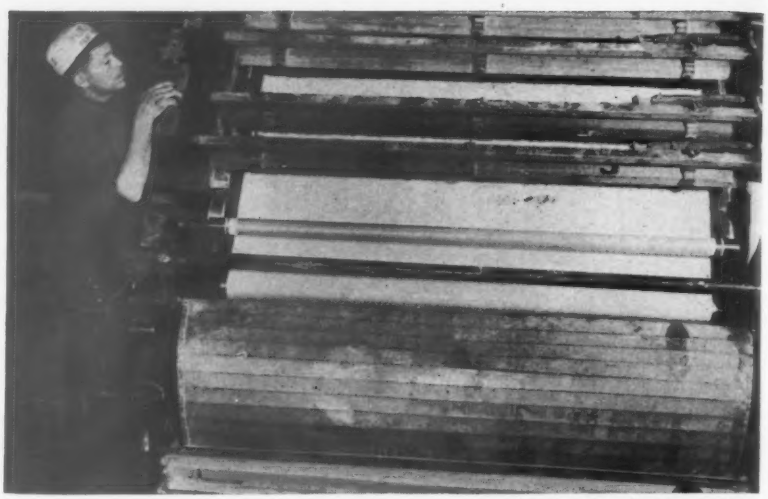
Vinyl Polymers and Copolymers

The vinyl polymers have become important coating materials, because of the wide range available and because of the individual properties. The development of vinyl compounds as dispersion coatings has increased the interest of paper converters in these materials. The many hydrosols or latices available are water dispersions of the resins, capable of forming thin coatings without the use of volatile solvents. In some cases coherent films are formed upon air drying, whereas others require the aid of heat to fuse the resin aggregates. Plastisols and organosols have also found widespread use because one application may be equal in thickness to a number of coats applied by solvent. Solvent coatings are capable of producing thin films with very good protective qualities and gloss. In general, for most vinyls, extrusion and calendering techniques are preferable to the hot-melt method of application.

Polyvinyl Chloride

The polyvinyl chloride industry produced almost 300 million pounds of the resin in 1950, and production in 1952 reached approximately 431 million pounds. The paper converters use a sizable amount of this material and because of new uses being discovered daily for these coatings, the demand for polyvinyl chloride is likely to increase. It has good resistance to oils, greases, water and chemicals, and is tough, hard and glossy.

The hardness and toughness of polyvinyl chloride may be modified by the addition of chemical plasticizers. However, changes in coating properties frequently occur upon aging due to plasticizer migration. Recently, vinyl chloride has been plasticized during manufacture by combination with butadiene-acrylonitrile. This modifier acts as a non-migrating, non extractable plasticizer to produce coatings with improved flexibility and grease-resistance suitable for food packaging. Vinyl chloride has been used extensively because it lends itself to modification by copolymerization with softer vinyls.



Courtesy of the Hercules Powder Co

"Coating Machine" (Brush Coater) showing coating mixture and brush section.

Polyvinyl chloride is difficult to use in hot melt coatings because of the high viscosity of the melts. Prolonged heating at the softening temperature of 375°F. results in decomposition of the polymers, and plasticizing to desirably low viscosity results in soft tacky coatings. Calendering techniques have been used with success in applying the resin to base sheets. Solvent methods of applying polyvinyl chloride have found wide usage and dispersion methods show promise of attaining equal acceptance.

Polyvinyl Acetate

Polyvinyl acetate is used most as an adhesive or in adhesive mixtures. Its ability to heat-seal and form pressure-sensitive coatings is one of the most valuable properties of the polymer. Polyvinyl acetate is also used in making odorless, tasteless, non-toxic, and grease-proof coatings. The resin has an inherent tendency to absorb water, a property which may be somewhat reduced by chemical treatment and fusion of coating; however, blocking cannot be eliminated where coatings are exposed to high humidity at high temperatures. The material is available in varying degrees of polymerization. Such properties as the temperature of heat sealing, viscosity of the solution, and flexibility are enhanced as the degree of polymerization increases.

Polyvinyl acetate may be applied to paper from hot melts, solutions and dispersions. Coatings applied from solutions are superior in water resistance, film clarity and gloss to those deposited from water dispersions. However, for some uses, water dispersions are more versatile and easier to apply. Coatings made from dispersions of high solids content and low viscosity may be prepared and, when baked for a few moments above the softening temperature, show a marked improvement in transparency, gloss, and adhesion to the base sheet.

Vinyl Chloride-Acetate Copolymer

By copolymerization of vinyl chloride and vinyl acetate in proper proportions, the properties of the copolymer may be adjusted to fit the use requirements. The hardness and toughness of polyvinyl chloride may be tempered by blending with the soft acetate to form coatings which are resistant to grease, water, chemicals and fire. The great strength of the thin films formed by the copolymer makes it one of the most important of the vinyl derivatives. They are normally applied from solutions or dispersions and are

Courtesy of the Hercules Powder Co.

Applying a lacquer coating to paper on Sprout-Waldron coating machine.

used in gloss coatings, food wraps, waterproofing wallpaper and many other paper products.

Polyvinylidene Chloride

Polyvinylidene chloride, as the unmodified polymer, has not been widely used in paper coatings, although it has very low water-vapor and gas permeability and its resistance to chemicals, solvents and grease is good. The probable reasons for its limited use include low solubility in organic solvents, limited compatibility with modifying agents, and a decomposition point close to the softening temperature. Polyvinylidene chloride has obtained a fair degree of importance for use in combination with other resins in the copolymer field. Vinylidene chloride copolymerized with acrylonitrile, vinyl chloride or vinyl chloride-acetate produces resins with improved solubility, good flexibility, adhesion and low water-vapor permeability.

The vinyl chloride-vinylidene chloride copolymer is becoming increasingly popular with paper converters. Coatings exhibit good water-vapor, grease and chemical resistance, are heat sealing, provide high gloss and are free from odor and taste. The coatings are therefore suitable for liquid and dry food products and for high gloss finishes on labels and magazine covers. The copolymer is also available as a water dispersion, containing up to 60% solids. A number of thickening agents are available for increasing the viscosity of dispersions for roll and knife coating.

Polyvinyl Alcohol

Polyvinyl alcohol, produced by the hydrolysis of polyvinyl acetate, is available in varying degrees of polymerization and hydrolysis. Its chief use is in coatings requiring a high degree of grease-proofness or a low degree of permeability to gases. It is also used in adhesives, and as a transparentizing and sizing agent for paper. It is interesting to note that the surface adhesion of polyvinyl alcohol coatings appears to increase as the degree of hydrolysis of the resin decreases.

Polyvinyl Aldehydes

Three members compose the polyvinyl aldehyde family: Polyvinyl formal, polyvinyl acetal, and polyvinyl butyral. Of these, only polyvinyl butyral has found any acceptance among paper converters. Polyvinyl butyral can be applied as solvent, hot melt, and dispersion coating and is tough, flexible at low temperatures and grease resistant. However, it is not very resistant to moisture.

Polystyrene

Polystyrene, being vinyl benzene, can be classed with the other vinyl polymers. Its low cost, low degree of water absorption, good grease resistance, gloss, hardness and heat sealing properties make it adaptable to many needs. In order to obtain good film properties, it is necessary to compound polystyrene with plasticizers or with resin modifiers.

Coatings may be made from solution, dispersion or hot melt. Dispersion coatings require a short, high-temperature bake to produce a film with maximum protective properties. Polystyrene has found application in the manufacture of washable wallpaper and in other decorative uses.

Acrylic Resins

The group consists of the polymers of the lower esters of acrylic and methacrylic acids. These polymers range from soft and tacky, to hard and brittle resins. The acrylic and methacrylic resins are heat sealing and their colorless transparency exhibits excellent resistance to light and aging. The residual odor of the higher ester polymers has limited their use in some applications. Coatings of the polymers made from solutions, dispersions or hot melts are useful where water resistance and permanent transparency are desired.

Polyethylene

Since the end of World War II, polyethylene has become available in commercial quantities and the paper coating industry has found it increasingly useful. Polyethylene is employed in a wide range of molecular weights which yield variations in hardness, brittleness and elongation.

Polyethylene may be applied to paper by three methods; hot melt, hot solution and extrusion coating. Dispersion coatings have not yet appeared. Polyethylene coatings are very tough and exhibit good moisture-proofness and chemical resistance. The permeability to gases is exceptionally high. Coatings also offer some degree of resistance to vegetable and animal oils.

Polyethylene also finds widespread use as a modifying agent for waxes and other film formers. It is not used extensively to modify wax coatings for improved scuff resistance, high gloss, blocking resistance and sealing strength.

Valuable properties of polyethylene make it suitable for coatings

on breadwrappers, bakery trays, frozen foods, butter and lard cartons, and multiwall bags. The combined properties of high gas permeability and good water-vapor resistance make it especially suitable for packaging fresh produce.

Polyester Resins

Unsaturated polyesters have been developed which can be further polymerized under the influence of heat or catalysts. Resins of this type are classified as thermosetting and therefore yield coatings which are not thermoplastic. Polyesters are, relatively, newcomers in the field of paper coatings so that applications are still in the development stage. They provide high gloss coatings, resistant to oils, grease, chemicals and abrasion. They are useful for label coatings because they are not affected by contact with heated surfaces. Other uses include decorative high gloss coatings and table coverings.

Proteins and Related Compounds

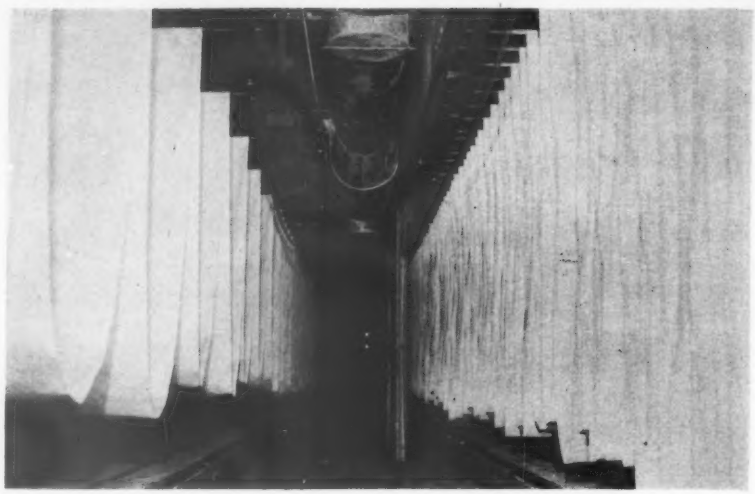
Zein and polyamide, two resins in this classification, are of interest in the coating of papers. These materials are obtained from natural products and provide high gloss, hard, grease-proof coatings. Polyamides of the nylon type have not found application in paper coatings, due to cost and high working temperatures.

Zein

Zein can be applied to paper from solution, water dispersion, or by hot melt. The material must be plasticized to give optimum scuff resistance, grease resistance and gloss. The coatings are slightly amber colored and may have some odor; however, they are satisfactory for use in decorative coatings and in food packaging where grease-proofness is desired Zein coatings can also be formulated having heat-sealing properties.

Polyamides

The polyamides have been marketed as solid, thermoplastic resins and only recently as water dispersions. The dispersion coatings, when fused at high temperatures, develop films comparable in quality to hot melt and solvent coatings.



Courtesy of the Hercules Powder Co.

"Festoon Drier" for drying coated paper. The sheet is traveling continuously through drying chamber. In the drying process, note the wet sheet on right and dry sheet returning on left.

These coatings may be modified to improve low temperature flexibility, heat sealability, greaseproofness and water resistance. The slight odor and light tan color are not objectionable for most packaging applications.

Natural and Synthetic Rubber

The use of natural rubber in paper coatings is limited although rubber derivatives and synthetic rubbers are finding extensive application. Natural rubber offers poor grease resistance, relatively poor aging properties, and poor water vapor permeability, although these properties may be improved by proper compounding. When used as a modifying agent, rubber contributes film strength, flexibility, scuff resistance and some chemical resistance. It is used in specialty food packaging and in the manufacture of adhesive coatings.

Cyclicized Rubber

Cyclicized or cyclorubber may be applied to paper from solution or as a hot melt. Such coatings provide good resistance to water and water vapor, excellent anchorage, heat sealability, low gas permeability and good aging properties. Cyclicized rubber may be used where high gloss and chemical resistance are desired. It is valuable as a modifier for other coating compositions.

Chlorinated Rubber

Natural rubber, reacted to contain about 68% chlorine, forms a thermo-plastic, resinous material which is odorless, tasteless, and non-flammable. Chlorinated rubber must be modified with resins, plasticizers and waxes to develop flexibility, low water absorption, and low water-vapor permeability. It may be used to give high gloss, heat sealing coatings or for pressure sensitive adhesives.

Polyisobutylene

Polyisobutylene is a synthetic, thermoplastic elastomer suitable for compounding with waxes, resins and plasticizers to produce a wide range of coatings. Properties of polyisobutylene vary with the degree of polymerization, but all grades show good flexibility at low temperature, heat sealability and resistance to water and water-vapor. Polyisobutylene is used in coatings for food packaging and in pressure sensitive coatings.

Isobutylene-diolefin Copolymer

The isobutylene-diolefin copolymer, commonly known as butyl rubber, differs from polyisobutylene in that it is slightly unsaturated. Butyl rubber is less permeable to gases than other rubbers, and it shows remarkable resistance to chemical action, abrasion and aging. As in the case of other

rubber-based coatings, butyl rubber is compounded with waxes, resins and plasticizers to develop heat sealing coatings which are moisture-proof and which have excellent flexibility at low temperatures.

Butadiene-Styrene Copolymer

In 1950, twice as much butadiene-styrene copolymer (GRS) was manufactured as other synthetic rubbers but relatively small amounts have been used in protective paper coatings. The main uses of GRS on coated papers have been to provide electrical insulation and in adhesive coatings.

Since the war a modified butadiene-styrene copolymer has been developed which has properties similar to those of cyclicized rubber. It provides coatings which have excellent resistance to water vapor, strong heat seals, good blocking resistance, excellent anchorage to a variety of surfaces and good aging properties. This copolymer has a property which makes it interesting for packaging materials — the ability to slip readily over heat sealing plates.

Styrene-Isobutylene Copolymer

The copolymers of styrene and isobutylene are recent developments for use in protective coatings. They can be applied from solvent or compounded for hot melt or extrusion coating. These "S-polymers" are resistant to water vapor transmission, water absorption, transmission of gases and to aging. Plasticizers, waxes, resins and other elastomers may be added to the S-polymers to obtain modified coatings, which should find application in the packaging of fresh, dried and frozen foods.

Miscellaneous Rubber Derivatives

Rubber hydrochloride has found little use as a paper coating since it does not lend itself to hot melt or solvent coatings.

Polymers of chloroprene are used to some extent for coating fabrics but they have found little use on paper.

Miscellaneous Materials

The alkyd resins are reaction products of polyhydric alcohols with polybasic acids. The resins exhibit a wide variety of properties, dependent on the structure of the polymers. These polymers may be classified as pure alkyds, oil-modified alkyds, natural-resin modified alkyds and various combinations. Their chief use in the paper coating field is as additives in cellulosic lacquer formulations for the improvement of gloss, hardness and heat sealability.

Some of the newest types of synthetic resins for coating are the styrenated alkyd resins which were introduced in 1948. They are comparable to cellulose nitrate lacquers in speed of drying and the dry films exhibit very good gloss. They are resistant to gasoline, acids, alkalis and water, and are relatively low in cost.

Phenol-formaldehyde resins will produce coatings of high gloss and hardness but lack of flexibility limits their usefulness as surface coatings for paper.

The amino resins, such as the urea and melamine formaldehyde polymers, have high gloss and resistance to grease, but poor flexibility. While used but little in surface coatings, they are important in the manufacture of wet-strength papers.

New Developments

New synthetic plastics continue to appear which are film formers with potential utility for paper coating. Extremely high melting plastics like polytetrafluoroethylene and the chlorofluoropolymers have not been well adapted for this purpose, but copolymerization with other monomers is leading to modified resins which may be more suitable in melting point, solubility, and adhesion properties for coating on cellulosic bases. The dispersion technique has also been found useful in applying this type of resin.

The long chain polyamides of the nylon type may also eventually come into paper coating use. A new polymer based on caprolactam shows good properties including transparency and adhesion.

Polymers from ethylene glycol and terephthalic acid give rise to another interesting series of resins. A range of hardness and other properties is obtainable by substitution of other glycols or by using aliphatic dibasic acids in the polymer. Unsaturated constituents have also been used to give cross-linked polyester resins which are adaptable to thermosetting types.

Another recent addition to the resin field — chlorinated polyethylene — is available in two degrees of chlorine content. The good solubility of the resins suggests their application from solvent and potential utility for paper coating.

New resins made from bisphenols with formaldehyde show improved flexibility over resins from urea or phenol and formaldehyde. Use of other aldehydes, ethylene oxide, or epichlorhydrin also gives film formers with good strength, water resistance and adhesion to cellulose.

Future Outlook

The development of new and improved coated papers is dependent on the availability of suitable film formers and on methods of applying them. When employed in hot melt or solvent coatings, increasing content of the film former generally produces higher viscosity and more desirable properties in the film. Some of these coatings are of such high viscosity that they require special techniques in their application to paper. One recent method for high viscosity hot melts consists in extruding the material through a slit, stretching the film to the desired thickness and then applying to the base sheet.

Coating materials in the form of dispersions have lower viscosities than hot melts, and are easier to apply. Consequently there is a trend toward greater utilization of these compositions for the coating of paper.

Obviously, economic factors will influence selection of the type of coating and the method of application in preparing a coated sheet of required properties. Present world conditions may retard certain developments, but military needs will introduce other requirements. The ingenuity of chemical manufacturers in supplying new raw materials, and of converters and machine builders in using them, has met the increasing demand for these products, and indicates that there will continue to be new and improved paper coating materials for the development of new markets.

Application of Fatty Acids and Alkyds

WITH DISCUSSIONS OF SOURCES AND COMPOSITIONS

By W. L. RIEGLER*

THE term "fatty acid" actually applies to acetic acid and its homologs, and includes any of the aliphatic mono-carboxylic acids obtained by hydrolysis of animal or vegetable fats and oils. These fats and oils are the primary source of commercial fatty acids.

All of the commercially available fatty acids are derived from some 40 different glyceride oils and only 10 of these account for the major percentage of the total fatty acid production.

The principal saturated acids which concern our industry are:

Caprylic acid with an 8-carbon chain

Capric acid with a 10-carbon chain

Lauric acid with a 12-carbon chain

Myristic acid with a 14-carbon chain

Palmitic acid with a 16-carbon chain

The unsaturated acids which are of importance in this discussion are:

Oleic acid—an 18 carbon chain, 1 ethylenic double bond

Linoleic acid—an 18 carbon chain, 2 ethylenic double bond

Linolenic acid—an 18 carbon chain, 3 ethylenic double bond

At this time I would like to tell you about the new Neo-Fat specification and composition chart. I will go through this list quickly for the purpose of acquainting you with the new nomenclature. Chart I.

Short chain saturated fatty acids —carbon chain and acid value.

Stearic and Palmitic acids—carbon chain and titer.

Pressed Stearic Acids—carbon chain and titer.

Oleic acid—iodine value and titer.

Unsaturated acids—iodine value.

Tall oil—rosin content.

Coconut oil is one of the chief raw materials for the manufacture of saturated or (C_8C_{14}) fatty acids. It is hydrolized to fatty acids which are fractionally distilled to produce high purity Neo-Fat 8, 10, 12 and 14.

Application in Alkyds

The main application of these saturated Neo-Fats in our industry, is for short-oil, non-oxidizing glycerol phthalate alkyds. An average formulation would be:

Saturated fatty acid— 29%
Phthalic anhydride— 43%

This type of an alkyd will require approximately 20% excess of glycerol and should be processed at 400°F. to 440°F. in order to obtain a suitable vehicle at an acid value of 6-10. These alkyds complement the very hard and brittle urea,

*Presented before the February 1953 meeting of New York Vehicle Manufacturers Group. Mr. Riegler is connected with Protective Coatings Section, Armour Chemical Division, Chicago, Ill.

ARMOUR FATTY ACID SPECIFICATIONS

APPROXIMATE CHEMICAL COMPOSITION

	Nett-Fat		Type	Titer °C		Iodine Value		Acid Value		Unsaps.	Moisture	Gardner 1933 Stds.	Lovibond Cell	Drop Point		Caprolic	Caprylic	Capric	Lauric	Myristic	Palmitic	Stearic	Oleic	Linoleic	Linolenic	Rosin Acids
	NEW	OLD		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MAX.	MAX.	MAX.		MIN.	MAX.											
Short chain saturated acids	N.F. 8	N.F. 7	C.P. Caprylic F.A.		16		1	387	392	0.2	0.2		2R-20Y 5¼"			3	93	4								
	N.F. 10	N.F. 9	C.P. Capric F.A.	28	33		1	323	329	0.2	0.2		2R-20Y 5¼"				3	92	5							
	N.F. 12	N.F. 11	C.P. Lauric F.A.	41	43		1	278	282	0.2	0.2	1	1R-10Y 5¼"					1	95	4						
	N.F. 14	N.F. 13	C.P. Myristic F.A.	48	52		1	243	249	0.2	0.2		1R-10Y 5¼"						3	94	3					
	N.F. 255	Stripped Coco	Stripped Coco F.A.	24	30	8	16	250	260	1.0	0.5	3	2.5R-25Y 5¼"						57	21	10	2	7	3		
	N.F. 265	D.D. Coco	Dist. Coco F.A.	22	26	8	14	258	272	0.5	0.3	3	3.5R-15Y 5¼"				8	7	49	17	9	2	6	2		
Stearic and Palmitic acids	N.F. 16	N.F. 156	C.P. Palmitic F.A.	56	62		2	216	220	0.5	0.5		1R-10Y 5¼"								90	6	4			
	N.F. 16-54	N.F. 154	Eutectic Palmitic-Stearic	53	55		5	211	213	0.5	0.5		1.5R-15Y 5¼"								67	29	4			
	N.F. 18	N.F. 165	C.P. Stearic F.A.	65	68		5	195	199	0.5	0.5		1.5R-15Y 5¼"								6	90	4			
	N.F. 18-59	N.F. 158	Rubber Grade Stearic	52	60		9	195		2.0	0.5		8R-40Y 1"							3	29	63	5			
	N.F. 18-61	N.F. 160	Stearic-Palmitic	60	63		5	198	205	0.5	0.5		2.5R-25Y 5¼"								22	75	3			
Pressed Stearic acids	N.F. 18-53	Single Pressed Stearic	Single Pressed Stearic	52.8	53.5	9	16	199	207	2.0	0.5		.2OR-15Y 1"								48	43	9			
	N.F. 18-54	Double Pressed Stearic	Double Pressed Stearic	53.9	54.4		7	203	209	2.0	0.5		1.OR-2.0 5¼"								48	46	6			
	N.F. 18-55	Triple Pressed Stearic	Triple Pressed Stearic	54.8	55.3	1.5	2.5	205	210	2.0	0.5		.5R-2Y 5¼"								48	49	3			
	N.F. 18-56	Buff Stearic	Buffing Stearic	53	57		9	200		2.0	0.5		1.5R-15Y 1"								48	43	9			
Oleic acids	N.F. 94-10	8-11 Titer Red Oil	8-11 Titer Crys. Red Oil	8	11		95	193	200	2.0	0.4		6R-25Y 1"								5	6	78	10	1	
	N.F. 94-04	Low Titer Red Oil	Low Titer Crys. Red Oil		5		95	193	200	2.0	0.4		6R-25Y 1"								4	5	80	10	1	
	N.F. 92-10	8-11 Titer White Oleic	8-11 Titer Crys. Dist. White Oleic	8	11		95	195	201	1.5	0.4		1R-10Y 5¼"								5	6	78	10	1	
	N.F. 92-04	Low Titer White Oleic	Low Titer Crys. Dist. White Oleic		5		95	195	201	1.5	0.4		1R-10Y 5¼"								4	5	80	10	1	
	N.F. 90-14	C.P. Oleic	Comm. Pure Oleic F.A.	10	14	85	90	198	200	1.5	0.4		1R-10Y 5¼"								4	3	89	4		
Unsaturated fatty acids	N.F. 55	D.D. Palm	Distilled Palm F.A.	43	47	45	55	203	211	0.5	0.5		1R-10Y 1"							2	45	4	43	6		
	N.F. 65	D.D. Animal	Distilled Animal F.A.	39	43	50	65	195	205	1.5	0.5		2R-20Y 1"							2	26	16	50	6		
	N.F. 70	Lube base	Lube base	36	38	70	87	196	202	3.0	0.5		3R-30Y 1"								20	9	47	24		
	N.F. 105	D.D. Cotton	Distilled Cottonseed F.A.	34	38	95	110	198	204	2.0	0.5	8	2R-20Y 1"								21	2	33	44		
	N.F. 110	D.D. Corn	Distilled Corn F.A.	28	30	100	115	197	204	2.0	0.5	8	2R-20Y 1"								8	3	47	42		
	N.F. 115	Mixed Veg.	Distilled Mixed Veg. F.A.	26	34	105	125	194	204	4.0	0.5		2R-20Y 1"								8	3	44	41		4
	N.F. 720	N.F. 3	*Fract. Cottonseed F.A.		26	115	125	196	202	2.0	0.5	9	2.5R-25Y 1"								8	2	45	45		
	N.F. 130	D.D. Soya	Distilled Soya F.A.		26	125	135	196	202	2.0	0.5	4									7	4	34	53	2	
	N.F. 140	N.F. 3R	*Crys. Dist. Cottonseed F.A.		5	140	143	197	202	0.5	0.2	2	1.2R-12Y 5¼"										44	55	1	
	N.F. 150	Crys. Soya	*Crys. Dist. Soya F.A.		0	150		197	202	0.5	0.2	2											38	56	6	
Tall oil fatty acids	N.F. 42-06	N.F. D-142	Fractionated Tall Oil		17	125		193	198	2.0	0.5	4	4R-40Y 5¼"										50	40	4	6
	N.F. 42-12	N.F. S-142	Fractionated Tall Oil		20	125		190	196	3.5	0.5	9	3R-30Y 1"										46	39	3	12
	N.F. 42-70	N.F. D-242	Fractionated Tall Oil	Liquifies at 250°F				173	184	8.0	0.5	10	4R-40Y 1"										18	14	1	67
Pitch products	Tall Oil Pitch												Brown	30	50											15-30
	Cottonseed Pitch												Brown	20	50			15-25% Fatty Acids								
	Marine type pitch												Dark Brown	25	45											

CHART I

urea-formaldehyde and melamine resins by supplying plasticity and toughness, and overcome the lack of adhesion, which is claimed to be characteristic of the amine resins.

These alkyds have excellent color, color retention, gloss and gloss retention; they are not sensitive to overbakes, do not detract from the fast heat cure, and have excellent alkali resistance and pigment stability.

Neo-Fat 12 produces a short oil alkyd of a Gardner color 1-2 at 60% non-volatile content.

A specific formulation on the fusion method is as follows:

Neo-Fat 12	291
Phthalic anhydride	427
18% excess C.P. Glycerol	276

Process all ingredients at 440°F. (1'45") to an acid value 10; viscosity Z_2-Z_3.

We have followed through on a combination of 40% Neo-Fat 10 and 60% Neo-Fat 14 as a direct replacement for Neo-Fat 12 in the same formulation with final characteristics of Z_3 viscosity; 8.0 acid value; and 4 color.

This slight color differential in the low range of the scale cannot be detected in the white enamel. There is the possibility that this blend can contribute to a slightly better adhesion but our tests did not indicate this.

Other types of blends of saturated fatty acids were checked and we concluded that this combination of 40/60 is the ideal fatty acid to take the place of Neo-Fat 12. It was impossible to distinguish between the heat-cured films for color, gloss, hardness, resistance to boiling water, and caustic solution.

The most important point to all concerned is that one can obtain a fatty acid of equal quality at less cost per pound.

The alkyd manufacturers were satisfied for many years with short oil coconut alkyds, but since they were always striving for better and whiter alkyds, they were no longer content to use fatty acids as they come in their natural glycerides. They have found out which acids contribute to the good quality of their products and which are detrimental. Therefore the fatty acid producer has been able to supply materials of the highest purity through the process of fractional distillation. Whenever the vehicle manufacturer is called upon to produce the highest possible quality alkyd, he will always choose a fractionated fatty acid because the unwanted, undesirable and detrimental fractions have been removed.

Types of Fatty Acids

Animal fat is a product from the meat industry, sold industrially as tallow and greases, and contains equal amounts of saturated and unsaturated fatty acids.

The saturated fatty acids are primarily palmitic and stearic in a ratio of 60 to 40; the unsaturated acids consist chiefly of oleic acid with a very small amount of linoleic.

Grouping 2, 3, 4, stearic and palmitic acids, pressed stearic acids and oleic acids, have applications in the rubber industry, shaving creams, cosmetics, buffing compounds, grease, pharmaceutical operations. Oleic acid also finds its application in shampoos, liquid soaps, dry-cleaning soaps, floor waxes, metallic oleates, etc.

Cottonseed and corn oil are known as non-drying oils and contain 33-45% oleic, 43% linoleic acids and 10-24% saturated fatty acids, which are chiefly palmitic. But the quality of these acids is improved markedly through the removal of C_{16}.

Composition of soyabean oil—
11-14% Saturates (Palm & Stearic)
26-35% Oleic
52-60% Linoleic
2- 6% Linolenic

Removal of the C_{16} saturates by fractional distillation will also improve the drying qualities but it will automatically increase the linolenic fatty acid content, which we all want to avoid for the manufacture of a high quality color and color retention alkyd.

We have received requests from people in this audience for a 95% pure linoleic fatty acid and, rightly so, because our experience indicates that this would be a very ideal raw material.

The most logical starting materials would be either Sunflower oil with 59% Linoleic, or, better yet, Safflower oil with 76% Linoleic acid content.

It is impossible to economically manufacture an acid much above 75% linoleic content with our present knowledge and equipment. A eutectic of oleic and linoleic acid occurs on crystallization; starting with Safflower oil we could not expect more than 77% linoleic acid. There is a procedure of brominating and separating linoleic from oleic by solubility difference and then de-brominating, but this method would bring the cost of fatty acid out of reason.

Armour Chemical Division has sampled the industry several years ago with a 75% linoleic acid. Everyone praised the quality of this product, but only a few people had actual use for this fatty acid and then in only limited quantities.

The absolute minimum amount we can put through our equipment is 200,000 pounds and the cost of this acid would be in the neighborhood of 28 to 30 cents per pound.

Many of the vegetable oils, such as cottonseed, corn and soyabean oils, are used in tremendous quantities for manufacture of salad and cooking oils and shortenings. For these uses it is necessary that free fatty acids in the oils be removed by alkali refining. In this process, the free fatty acids are neutralized with caustic soda and the soaps that are formed are removed, together with a certain amount of occluded glyceride oil. This mixture of soap and oils is known as soapstock, or foots. Refined foots, such as cottonseed, corn, or soyabean, are used as raw materials for producing the component fatty acids.

Manufacture

To obtain fatty acids from glycerides, it is necessary to hydrolize or split the esters. This can be accomplished by saponification and acidulation, twitchellizing or high pressure hydrolysis. In this latter method, the oil and water are continuously pumped countercurrent through a tower at 500°F. and under high pressure to maintain the water in a liquid state. These acids are then distilled to improve color and purity of the acids or are fractionally distilled to remove one or more as components and accordingly produce individual fatty acids of high purity.

The lower boiling unsaponifiables and color bodies are stripped out as overhead, and the non-volatile unsaponifiables, colored ma-

terials, glycerides and polymers are left in the distillation residues. Through the use of bubble cap towers we are able to separate the fatty acid mixtures into fractions containing a very high concentration of acid of one carbon chain length. Among acids of the same chain length, differences in degree of unsaturation do not produce sufficient difference in boiling points to make separation by this means commercially practical. A new process known as solvent crystallization, on the other hand, offers a means of separating fatty acids according to melting point or solubility. Here the difference in solubility due to degree of unsaturation in the fatty acids is quite pronounced.

The mixed acids are chilled in a solvent and precipitated saturated acids are removed by filtration. With these processes we are able to improve the quality of fatty acids, reduce the saturation, and separate the individual fatty acids with respect to their degree of unsaturation.

Fractional distillation of cottonseed acids removes most of the palmitic acid, leaving a mixture of oleic and linoleic acids of equal proportions with a very low percentage of saturated acids which is stearic. Solvent crystallization of this mixture yields a fatty acid composed of 55% linoleic and 45% oleic acid with a negligible amount of saturated fatty acids. This product is known as Neo-Fat 140, with which you are no doubt very familiar. This product is characterized by its very low titer, good color, and non-yellowing properties. The low titer guarantees that the acids are a homogeneous liquid even at freezing temperatures and enables the user to manufacture consistent quality alkyds. Each and every lot is controlled not only to meet specification but also for its dependability and consistency for alkyd manufacture. We actually test each lot in either an alkyd or oil formulation which assures us, as suppliers, of the quality of color and processing time, and we know that we are delivering the best to the alkyd manufacturer.

Properties

Neo-Fat 140 has many outstanding characteristics and has been accepted as the outstanding fatty acid for high quality and premium vehicles. It fits into the category of *quality competition.* Some of our customers have found the use of Neo-Fat 140 is much cheaper over a long period of time because they have found one fatty acid that will fit into so many different types of vehicles showing advantages such as:

1. Ease of storage.
2. Minimum amount of space required because fewer fatty acids have to be kept in stock.
3. Acids do not require heating in hot rooms, which is a definite saving in time, labor and utility cost.
4. The manufacturer is always assured of charging the same homogeneous acid into the kettle and knows that the final alkyd will meet specification.
5. Therefore, additional time and labor savings can be gained by being able to process direct to specification without so-called "doctoring".

There are hundreds of different alkyds that can be made and each and everyone has a specific use and outstanding quality. There are several types of reactors and as many methods of manufacturing alkyds, but you can rest assured that Neo-Fat 140 will perform equally well in any of these.

Alkyds made with this acid will have satisfactory characteristics, such as resistance to cold water, boiling water, and chemicals; hardness, gloss and gloss retention, rate of air drying, with superior color and color retention.

If we start with soya foots in place of cottonseed foots and follow through with the same procedure as described a little while ago, we will have a crystallized, distilled soya fatty acid known as Neo-Fat 150.

The oleic-linoleic proportion of Neo-Fat 150 is the same as Neo-Fat 140, but it contains 6% linolenic acid which automatically raises the iodine value to 150.

Neo-Fat 150 will process somewhat faster in the kettle, its rate of dry will be faster, its color and color retention will not be as good as Neo-Fat 140; all other characteristics will be very much the same as N.F. 140. Neo-Fat 150 has its specific applications, as for instance, with Epon 1004 in the following formulation:

N.F. 150	54%
Epon 1004	46%

All ingredients were charged into the reactor and the agitation was started as soon as the Epon resin was liquefied. The reaction was carried out at 525°F. for a final viscosity of T-V at 60% non-volatile in a mixture of 75% Xylene and 25% mineral spirits.

Another example is —

Neo-Fat 150	47%
Epon 1004	43%
W.W. Rosin	10%

reacted in the same manner at the same temperature and reduced in 100% aliphatic solvent.

Similar esters were prepared with linseed fatty acids and compared. The straight linseed esters had a very rapid rate of drying, the film was one pencil hardness harder than the Neo-Fat 150 film when heat cured 30 minutes at 300°F. The rosin-modified esters had equal film hardness.

A 0.04% Cobalt naphthenate addition based on the vehicle solids gave a film hardness of 2B. The pencil hardness after 24, 48 and 72 hour air drying was the same in all cases. The straight N.F. 150 ester had better color, slightly better gloss, less yellowing when immersed in a 5% caustic solution and better gloss upon recovery. Resistance to 3-hours boiling water was excellent, while the linseed ester developed slight blisters which never disappeared.

Depending on the type of alkyd business that is pursued by the manufacturer, we, as fatty acid suppliers, are confronted with many requests to suit each individual case. Some customers depend on the quality of Neo-Fat 140 and are not too concerned with the cost of the acids since they realize savings after they have had an opportunity to become familiar with this fatty acid. The majority of Neo-Fat buyers, for reasons of their own, feel that they cannot use this quality acid except for prime goods, but would be interested in a lower cost fatty acid, which will run a close second to Neo-Fat 140 for color and color retention. Fur-

thermore, they are not too critical about rate of dry and, therefore, as we are in the process of ironing out all the final details in our manufacturing unit, it gives me great pleasure to make the announcement of a new member to our group of unsaturated Neo-Fats. It falls in the 130 range indicating its iodine value. Time did not permit us to accumulate all the technical data you would like to hear, so you are all invited to get onto the bandwagon at the same time, and request a sufficient quantity of Neo-Fat 130 for evaluation of this acid. I can assure you that you will be amazed with the color of the finished alkyd.

An interesting feature is a 26-gallon oil length maleated rosin "Dipentek," Neo-Fat 130 varnish using 5% maleic anhydride based on the rosin content.

A one-hour esterification was carried out at 480°F. and the temperature raised to 565°F. and held at this temperature without any further color change. We proceeded with a straightforward cook, without any little tricks of the trade and finished with a color of 9 on the Gardner scale at 50% non-volatile.

The last group of fatty acids to be considered are tall oil acids. Tall oil is not a glyceride oil but a mixture of oleic, linoleic and rosin acids. These fatty acids are delivered to us already hydrolyzed as an oily by-product from the sulfite process of paper making. Fractionation yields three types which differ in rosin content and correspondingly so in the unsaturated fatty acid content.

Packaging

You have heard the phrase "The product is no better than the Container". Armour Chemical Division has a packaging committee with representatives stationed at each operational unit who have the duty of continual control, even after packaging, and be on the alert for new and better types of containers. We do have aluminum tank cars in operation with exterior heating coils, minimizing local overheating, detrimental to good color. We have tested many types of coatings but none so far will stand up on heating coils placed within the shell. We have tested drum coatings and feel that we have found a very satisfactory one that has excellent flexibility and adhesion, which eliminates the possibility of pieces of coating chipping off through rough handling, and eliminates the possibility of contaminating the contents. You can expect this new container to deliver Neo-Fats to your plant within the very near future.

The application of various types of alkyds is governed by the specifications which are to be met by the coating. Most generally we are concerned about color retention for which we would choose a resin based on selected acids from cottonseed base, such as Neo-Fat 130. If we desire better film hardness, faster rate of dry and still maintain excellent color retention, we would select a product like Neo-Fat 140. Neo-Fat 150 would produce a still faster rate of dry, but we would have to sacrifice a portion of the color retention. The alkyd manufacturer has the choice of further improving certain characteristics with pentaerythritol alkyds instead of glycerol alkyds.

Selection

Finally, we come to the subject of choosing fatty acids in preference to fatty oils. I doubt that there is a single person in this audience that did not have the opportunity to air his viewpoint at one time or another on this very delicate subject. I could quite conceivably compare this to politics, "Everyone to his own belief"; nevertheless, oil users can and are being converted, simply because they are not able to compete with quality competition when using natural glycerides and by costly experimenting have found that they require fatty acids.

I would like to list a few items which may be helpful in your daily operation. You have heard these many times before and, by coincidence, Mr. Scott Patterson published an article on this very subject in the January 26 issue of *The American Paint Journal*, but it has never done any harm to bring them to light again. I am taking the liberty of including, with my own convictions, the work by H. A. Goldsmith, *Ind. Eng. Chemistry*, July 1948.

Summary

1. Drying oils are mixed glycerides of saturated and unsaturated fatty acids and the properties of the individual oils depend upon the type and proportion of the constituent acids making up the oil.

2. Oils do not blend with phthalic anhydride, therefore it is necessary to perform an alcoholysis, which is an equilibrium between glycerol, mono-glycerides, di-glycerides and tri-glycerides.

3. Fatty acids do discolor, upon prolonged storage, but the fatty acid manufacturer is constantly doing research in finding ways and means to stabilize the fatty acids. Great strides have been made in this direction through closer temperature control and improved fractionation procedures.

4. I must repeat that it is possible to make high quality alkyds because of the purity of fatty acids.

5. Daily production is increased when using fatty acids because all ingredients are charged into the reaction kettle. The addition of ingredients at a later time is time-consuming and inconvenient.

6. Greater flexibility of alkyds can be obtained with fatty acids by using other alcohols in place of glycerol.

7. Unreacted phthalic anhydride must be removed from the reaction kettle before proceeding with an alcoholysis, which is not the case when fatty acids are used.
   If oils are used in place of fatty acids, we find that

8. Bodying occurs at a higher acid value.

9. The resin is softer and tackier up to the point of reduction.

10. Heat curing is slower.

11. Bake films are softer.

12. The reduction viscosity of the product is lower at the same concentration.

The Lacquer Tensometer

FOR TESTING TENSIBILITY AND ADHESION OF LACQUERS AND PAINTS

Surface finishing with paints and lacquers is gaining a wide importance with regard to appearance as well as quality. In order to meet the requirements of test instruments in this field AB Alpha has completed the development of the lacquer tensometer in cooperation with the Swedish Mechanical Trade Institute and the Central Research Laboratory of the Swedish Paint and Varnish Industries. The lacquer tensometer is an instrument for testing tensibility and adhesion of paints.

ONE of the latest additions to the range of material testing instruments produced by AB Alpha is the lacquer tensometer, which is used for testing the tensibility and adhesion of lacquers and paints. It may, however, also be used for testing any surface finish which gives an electrically non-conducting coating on metals.

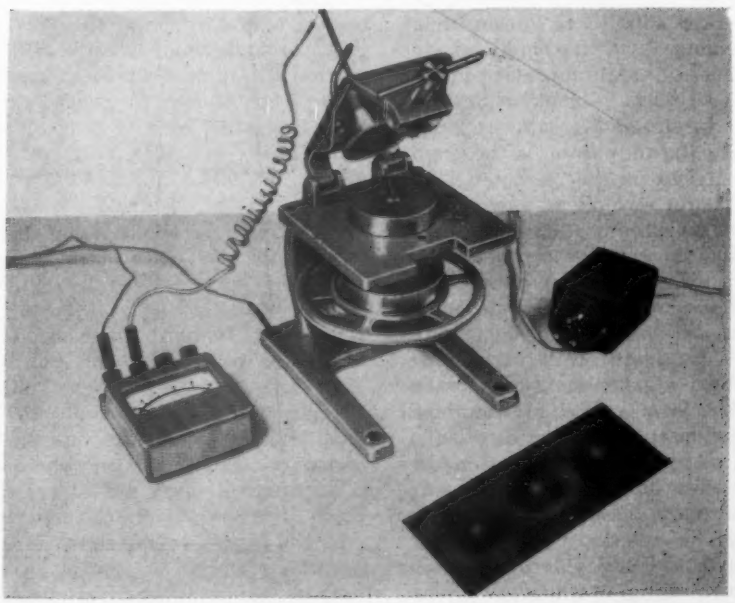
The surface finish is to-day not only a question of appearance but an operation of utmost importance for the quality of the product. This has created a need for instruments to test the properties of the finish in the same manner as the quality of the steel in the product is tested.. It is not only the manufacturers of paints and lacquers who have an interest in the quality of their products but quite naturally also the consumers who in the end apply the coatings and who have to check that the result meets their requirements.

The development in this field is in Sweden handled by the Central Research Laboratory of the Swedish Paint and Varnish Industries in which the largest paint manufacturers have an interest. This laboratory has developed and is using the test method employed in the lacquer tensometer and has given recommendations to the members associated with the laboratory regarding the application of the method. Alpha has in collaboration with this research laboratory completed the design of the tensometer, Fig. I, which is now being marketed.

Principle

In the tensometer a steel ball *E* is pressed up against a horizontally clamped plate *C* producing an indentation in the plate. The upper surface of the plate is coated

Fig. 1. Lacquer tensometer with ammeter, transformer and tested plate.



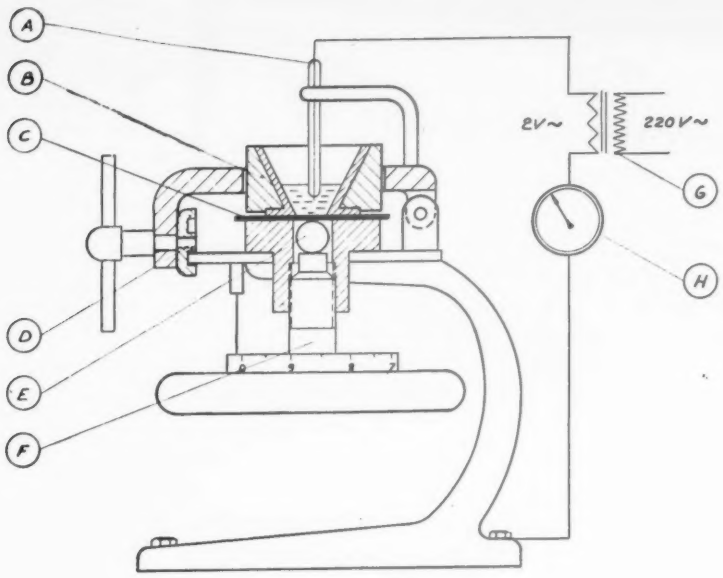


Fig. 2. Schematic Diagram.

A-Electrode, B-Electolytic cup with rubber insulator, C-Testing plate, D-Lock device, E-Steel, F-Screw spindle, G-Transformer, and H-Ammeter.

with a thin film of the material which is to be tested. As the indentation increases, the lacquer film extends to cracking. The test plate is firmly pressed against the bottom of a cup *B* containing an electrolyte. The inside and bottom of this cup is rubber covered and electrically insulated from the electrolyte, and the test plate. The lacquer film will now act as an insulator in a circuit between the electrolyte and the test plate. The circuit, Fig. 2, also contains a power supply, *i.e.*, transformer *G* giving 2 V, the milliammeter *H* and the platinum electrode *A*. When cracks start to develop, the insulation resistance is reduced and the current in the circuit is checked on the ammeter. The ball is pressed upwards by a screw fixed on wheel *F*, the latter being calibrated to indicate the depth of the indentation. For routine tests the indenting is proceeded with until the ammeter reads 0.5 mA and the depth of the indentation is then a measure of the quality of the lacquer film. If the depth of indentation and the corresponding current values are continuously recorded during the test, the relationship between these values may be plotted in a diagram similar to Fig. 3. On the diagrams shown in Fig. 3, which are typical, points have been indicated where cracks can be discovered by microscope. The electrical indication method is apparently considerably more sensitive. The results obtained by visual inspection in microscope at 50 times enlargement agree throughout very well with those registered electrically. The depth of indentation at which the first cracks become visible in the microscope coincides with the region of the diagram where the current is showing a considerable increase. The electrical method of indicating the origin and progress of the cracking is preferably applied when more detailed information is required regarding the porosity, tensibility, cracking and adhesion of the film.

Application

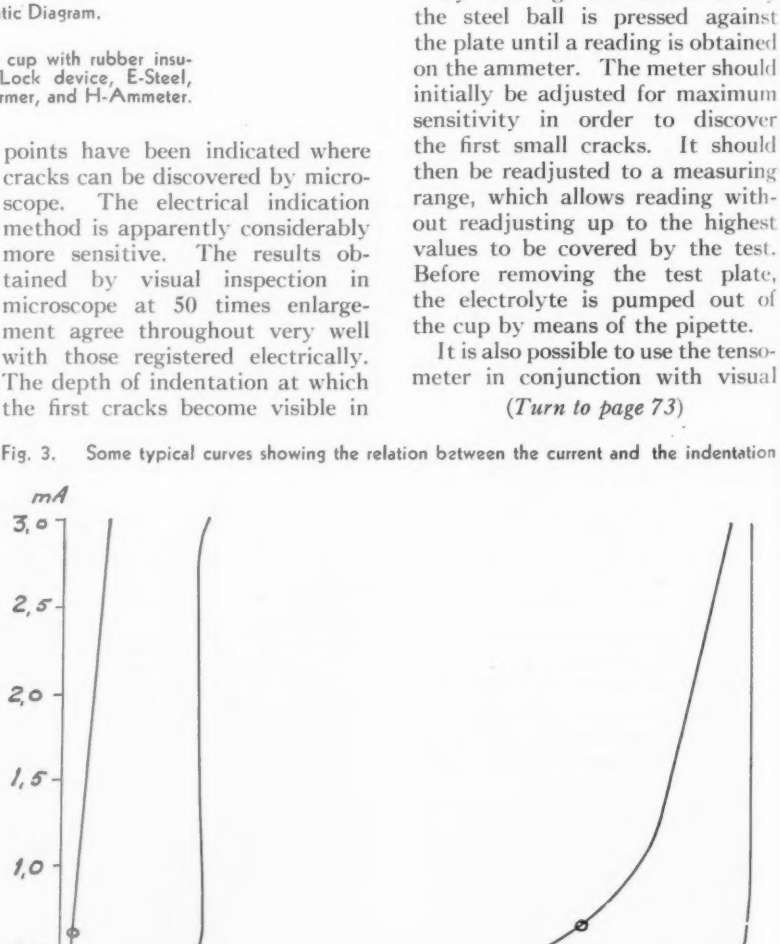
The test is carried out in the following way. The test plate is placed with the film layer upwards and underneath the electrolyte cup, which is pressed against the plate and secured by the locking device *D*. The insulated cup is filled with electrolyte up to the platinum electrode by means of a pipette with rubber ball.

By turning the wheel slowly the steel ball is pressed against the plate until a reading is obtained on the ammeter. The meter should initially be adjusted for maximum sensitivity in order to discover the first small cracks. It should then be readjusted to a measuring range, which allows reading without readjusting up to the highest values to be covered by the test. Before removing the test plate, the electrolyte is pumped out of the cup by means of the pipette.

It is also possible to use the tensometer in conjunction with visual

(*Turn to page 73*)

Fig. 3. Some typical curves showing the relation between the current and the indentation



Progress in Development Of Aerosol Paints

By GEORGE A. NICHOLS
Technical Director
Paint and Varnish Factories
Sears, Roebuck & Co.

FOUR or five years ago when the aerosol packaging industry was beginning to gain momentum, paint was one of the items that a number of people felt should be ideal for aerosol packaging. These people recognized the future market potential of self-spraying paint, in a convenient size package for use by the home owner, the handyman, or even the housewife. It was felt that aerosol paint would be ideal for painting, touching-up, or refinishing many items around the home which were either too difficult to coat satisfactorily with a brush, or too small to warrant buying not only a can of paint, but also a brush and thinner, with the subsequent trouble of cleaning up the brush after painting. Further, it was felt that regardless of the apparent high cost of the paint actually in the aerosol container, the consumer would pay for the convenience of using a self-spraying material.

Products Marketed

Today, as a result, there are three general types of paint products being successfully marketed:

1. Pigmented paints or enamels
2. Pigmented Lacquers
3. Clear or unpigmented finishes, to include varnishes, acrylics, lacquers, and vinyls.

When the project was first started in the Sears' paint laboratories to develop suitable paints for aerosol packaging, it was hoped that a conventional type paint such as a Four Hour Enamel could, with slight modification, be successfully used. That would have been the quick and easy way to solve the problem. However, initial laboratory tests quickly dispelled this idea. Unfortunately for the aerosol paint market, some producers in their haste to exploit the market, used the easy way, resulting in unsatisfactory products and consequent consumer disappointment and condemnation. Some of the early aerosol paints did not atomize correctly; failed to cover properly; sagged badly on vertical surfaces; and settled hard in the container causing the container to become inoperative.

Problems

It was soon realized by most people that that paint had to be specifically formulated for aerosol packaging. The principal problem was one of crowding as high a percentage of solids into the paint as possible, keeping the viscosity of the paint itself at a very low level. The high solids were necessary to produce a gloss paint having proper one-coat coverage, and the low viscosity was necessary for maintaining fluidity of the paint at low filling temperatures, and for proper spraying properties. The spraying properties were also dependent on both the type of propellant, and the specific spray valve used. The high solid concentration plus the low viscosity requirements contributed to an-another serious problem — settling. Additional problems were those of using solvents in the paint which would meet the ICC Regulations as regards Flash Point and yet contribute to the correct atomization without causing excessive flow of the paint when applied; and using

(*Turn to page 72*)

This paper was presented before 39th Mid-Year Meeting of the Chemical Specialties Manufacturers Association, Inc., Aerosol Div., on May 18, 1953 in Chicago, Ill.

Candid Shots of New York Production Club Annual Outing Held at Jumping Brook, Neptune, N. J. June 6

A-D-M To Produce Unsaturated Higher Alcohols at New Ohio Plant

A new group of basic chemicals, containing unsaturated higher alcohols will be produced at a new plant now being constructed by the Archer-Daniels-Midland Company at Ashtabula, Ohio.

Production of both saturated and unsaturated alcohols is expected by June 1954.

According to the firm, many of the alcohols which will be made at the new plant are not commercially available to-day.

Among the products the alcohols will be used in are vinyl plasticizers, corrosion inhibitors, anti-foam agents, peptizers for synthetic rubber, anti-oxidants, synthetic waxes and textile finishes.

Frank C. Haas, vice president in charge of the ADM Chemical Products Division which has its headquarters at Cleveland, will be in charge of the new operation. Mr. Haas pointed out that while the classical sodium reduction process will be used at Ashtabula, new techniques developed by ADM engineering and research groups are expected to afford several manufacturing shortcuts.

Because ADM is a major processor of linseed, soybean and marine oils, it is expected these products will be the principal raw materials used for the new alcohols. While cocoanut oil has long been favored as a raw material for the production of alcohols, its chemical composition is such that conversion into fatty alcohols results in only 10 per cent recovery in alcohols above C_{18}. On the other hand, the soybean molecule would produce approximately 92 per cent of these higher alcohols and linseed oil 95 per cent. Beef tallow, another commonly used raw material, would produce about 65 per cent of the higher alcohols and mutton tallow about 73 per cent.

According to Mr. Haas, the use of linseed and soybean oils as a major raw material for higher alcohols is long past due. The linseed oil molecule contains more than 800 combinations of fatty acids while the composition of the soybean oil is almost as complex. These, in the opinion of Mr. Haas, are two of the most promising but least explored molecules in existence.

While the production of the new unsaturated higher alcohols will be a new venture for ADM, the company has been manufacturing fatty alcohols and glycerides since 1936. At the present time ADM is making cetyl, stearyl and liquid alcohols from sperm oil at its plant located at Wyandotte, Mich.

In addition to alcohols, the Ashtabula, Ohio, plant will produce glycerine and caustic soda.

•

Sears, Roebuck Holds Paint and Varnish Sales Meeting in Dallas

Paint and varnish factory representatives of Sears, Roebuck & Company attended the firm's national sales management conference held recently in Dallas, Tex. Sales managers and other executives were also in attendance.

The conference members, guests of the DeSoto Paint & Varnish Company, were conducted on an inspection tour of DeSoto's plants being completed near Garland, Tex.

Business sessions included reviews of many technical and sales phases of the Affiliates' expanding activities. Several products were presented at the sessions.

Attending the conference were: Wendell G. Beauchamp, national sales manager; Messrs. Warren, Holcomb, Kleutgen, and Mulligan—general manager, general sales manager, district sales manager, and advertising manager, DeSoto Paint; E. H. Bucy, general sales manager of Benjamin Franklin Paint and Varnish Company; R. G. Brooks general manager of Carolina Paint & Varnish Works; W. T. Butner and G. J. Grieve, general manager and transportation sales manager, respectively of Pacific Paint & Varnish Company; A. W. Slocum, general sales manager of Illinois Paint Works; and T. L. Dahlberg, sales manager of John A. Steen Varnish Company.

From Sears' Chicago Office were: S. U. Greenberg, general manager, and G. A. Nichols, technical director with his administrative assistant, J. R. Dove.

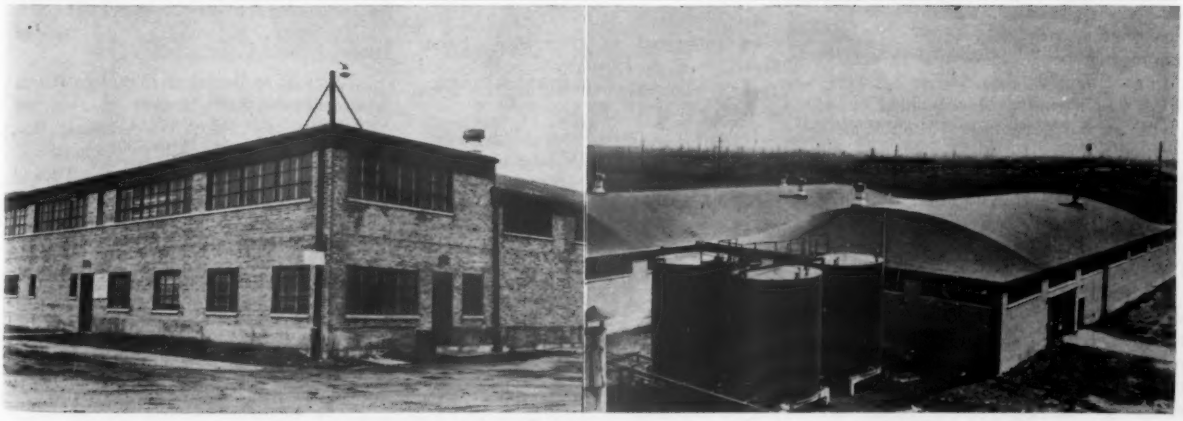
•

Philadelphia Company Changes Name to Acheson Industries, Inc.

The Peerless Printing Ink Company, Philadelphia, as of June 1, has been operating under the new name of Acheson Dispersed Pigments Co. Despite the name change, the operation will continue as a unit of Acheson Industries, Inc.

According to a company release, the name change was adopted because of the growth of a new part of the business—color dispersions. A little more than a year ago the color dispersion operations of Acheson Colloids Co., of Port Huron, Mich., were moved to Philadelphia.

At present, most of the color dispersions are made for plastics, which include polyethylene, polystyrene, vinyl, cellulose acetate, and cellulose acetate butyrate. As new plastics are developed, the line of color dispersions will be expanded to take care of their requirements.



Left: Executive and administrative offices of the Witco Chemical Company's Chicago plant have now been consolidated into one building. Right: New $150,000 warehouse recently completed at Witco's Chicago Plant to replace old one which burned down in 1952. The 25,000 square foot warehouse is equipped with a sprinkler system.

NEWS DIGEST

Hercules Research Director To Attend Science Meetings in Europe.

Dr. Emil Ott, director of research for the Hercules Powder Company, Wilmington, Del., left recently on a two-month European trip to attend a series of international science meetings.

Dr. Ott, serving as a delegate from scientific organizations in the United States, will visit Switzerland, Germany, France, The Netherlands, England, Denmark and Sweden.

In addition to attending the meetings, Dr. Ott will visit Hercules' overseas offices and confer with executives of several chemical companies in Europe.

•

Industrial Minerals Appoints Calif. Firm Exclusive Agents

Huntley Industrial Minerals, Inc., of Bishop, Calif., has appointed the Wharton Jackson Co., 714 West Olympic Boulevard, Los Angeles 15, Calif., as exclusive sales agents. Wharton Jackson, which also maintains an office in New York City, will handle Huntley's line of nonmetallic minerals, including aluminum and magnesium silicate pigments.

Wharton Jackson

W. C. Foster Elected Full-Time President of Mfg. Chemist Assoc.

William C. Foster, formerly deputy secretary of defense, and head of the Economic Cooperation Administration, was elected president of the Manufacturing Chemist Association at the MCA's 81st Annual Meeting held June 11-13, at the Greenbrier Hotel, White Sulpher Springs, W. Va.

The election of Mr. Foster, who becomes the MCA's first full-time president, took place during a joint outing with the Synthetic Organic Chemical Manufacturers' Association.

Election of the full-time president, which required an amendment to the association's by-laws, was recommended by MCA's board because of the enlarged scope of chemical manufacturing and the consequent expansion of the association's activities.

Mr. Foster will make his headquarters in Washington, D. C.

North American representatives of the Blackmer Pump Company at the firm's annual meeting held May 6-8, at Grand Rapids, Mich. Back Row, left to right: Jack Richmond of Grand Rapids; C. V. Travis of New York; E. J. Gallmeyer of Ft. Wayne; J. B. Caldwell of Grand Rapids; J. X. Hogan of Washington, D. C.; Bert Gurney of Omaha; A. W. Genske of Buffalo; Ralph Thornburg of Dallas; T. A. Garland of San Francisco; Bruce Hetler of Grand Rapids; C. F. Harper of Kalamazoo; W. A. Duncan of Atlanta; P. B. Duggan of Chicago; R. F. Leinberger of St. Louis. Front row, left to right: E. H. Lanthorn of Grand Rapids; J. H. Crosier of Rochester; K. D. Leitch of Toronto; H. D. Davidson of Grand Rapids; H. E. Oldham of Detroit; V. A. Brunson of Grand Rapids.

Blackmer Pump Co. Holds Sales Meeting at Grand Rapids, Mich.

North American representatives of the Blackmer Pump Company, attending the firm's annual sales conference held May 6-8, at Grand Rapids, Mich., reviewed product developments and sales and service procedures covering the petroleum and processing industries' use of hand, truck and transfer pumps.

V. A. Brunson, chief engineer at Blackmer, demonstrated refinements in pumps designed to maintain operating efficiency and eliminate pump replacement.

The keynote speaker, E. J. Gallmeyer, director and sales counselor, pointed out an optimistic outlook for distributors who stock, sell and service pumps, and are equipped to render assistance to plant engineers.

Sam Tour Award Presented at ASTM's 56th Annual Meeting

The Sam Tour Award, established to encourage research on the improvements and evaluation of corrosion testing methods, was among the citations presented at the 56th Annual Meeting of the American Society for Testing Materials held during the week of June 29, in Atlantic City, N. J.

J. R. McDowell, Research Engineer Mechanics Dept., Westinghouse Research Labs., Westinghouse Electric Corp., East Pittsburgh, Pa., was winner of the Award for his paper, *Fretting Corrosion Tendencies of Several Combinations of Materials.*

Mr. McDowell was one of five authors bestowed with an award for presenting an outstanding technical paper at one of the ASTM's yearly sessions.

New ASTM Officers

ASTM officers nominated for the ensuing year at the meeting are:

President, Leslie C. Beard, Jr., Assistant Director of Socony-Vacuum Laboratories, Socony-Vacuum Oil Co., Inc., New York, N. Y.;

Vice President (two year term), Claire H. Fellows, Director, Engineering Laboratory and Research Department, Detroit Edison Company, Detroit 26, Mich.

Member of Board of Directors (three year term), Neil A. Fowler, Director of Sales and Research, General Box Co., Des Plaines, Ill.; Richard T. Kropf, Vice President, Industrial Thread Division, Belding Heminway Corticelli, New York 18, N. Y.; Theodore E. Olt, Director, Research Laboratories, Armco Steel Corporation, Middletown, Ohio; John R. Townsend, Director of Material and Standards Engineering, Sandia Corp., Sandia Base, Albuquerque, N. M.; Kenneth B. Woods, Associate Director, Joint Highway Research Project and Professor of Highway Engineering, Purdue University, Engineering Experiment Station, Lafayette, Ind.

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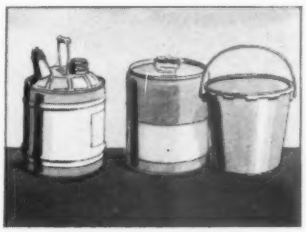
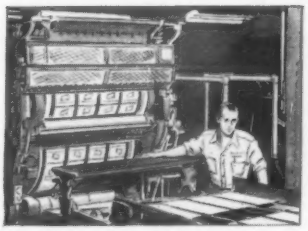
When you come to Continental for steel containers, we treat you as if you were our only customer. We hand-tailor our containers, lithography and engineering to your particular needs. We do our level best to do things your way. If you'd like this kind of service, why not call in a Continental man today.



CONTAINERS. Continental makes steel containers for bulk products, in standard styles including pails, drums, handi cans. We're always ready to discuss special-purpose containers.



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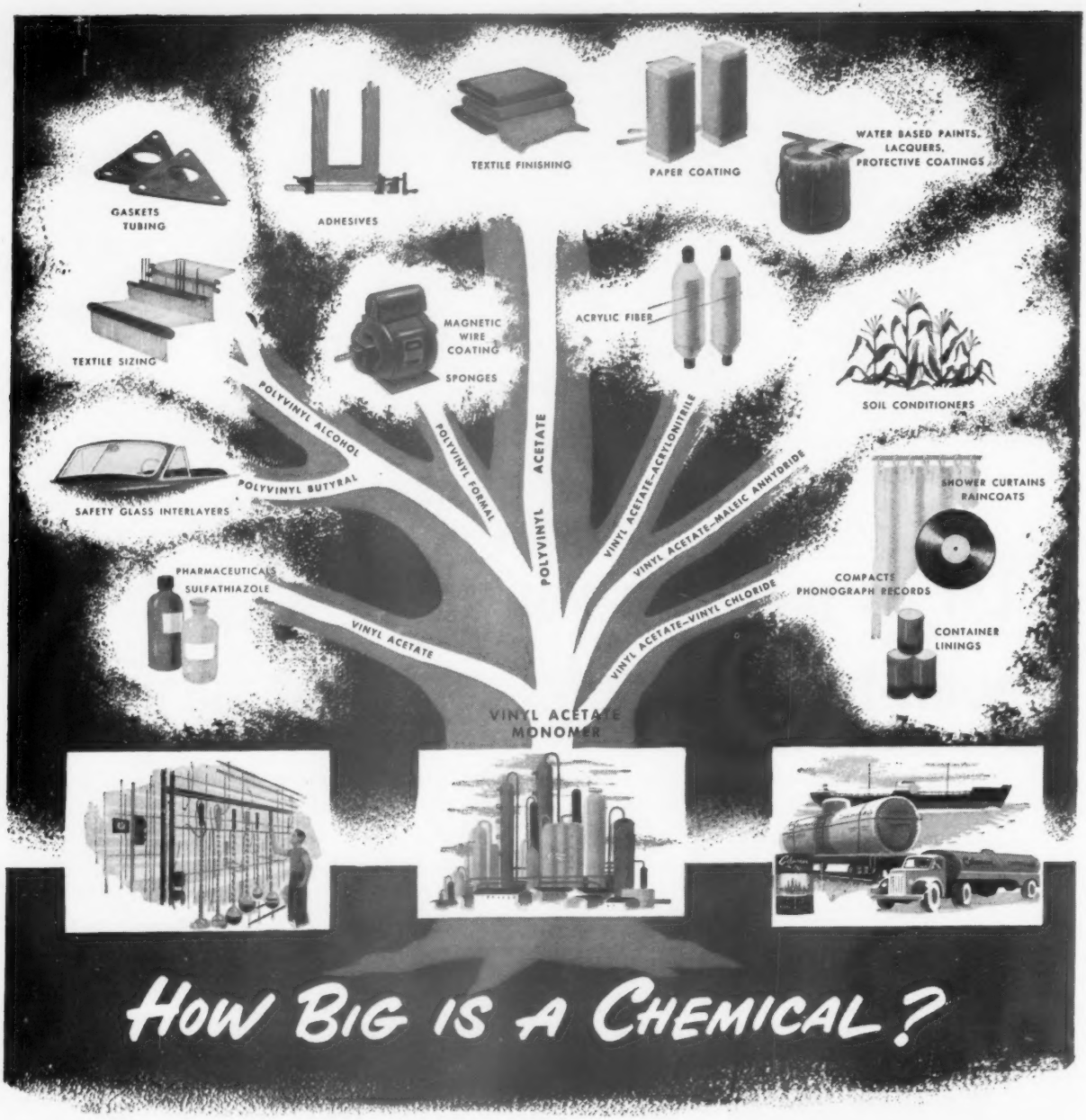

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CELANESE* VINYL ACETATE MONOMER OFFERS CREATIVE OPPORTUNITIES TO HUNDREDS OF AMERICAN INDUSTRIES

How big is a chemical? As large as its production volume . . . as broad as its applications. Vinyl Acetate Monomer—the basis for countless plastic products, paints, paper, textiles, pharmaceuticals, adhesives—is big. With the start of full-scale production at the Celanese Pampa plant, Vinyl Acetate gains a bigness that opens the door to more intensive research, far-reaching product development.

Celanese Vinyl Acetate Monomer—ready in tankcar quantities within a few weeks—will be produced by specially developed processes, utilizing Celanese-produced raw materials, in the newest, most up-to-date petrochemical plant in the country. Two grades of monomer will be available: A-grade, stabilized with diphenylamine, and H-grade, inhibited with hydroquinone.

The possibilities and opportunities for vinyl acetate derivatives warrant thorough investigation. We will be glad to assist you with complete technical data and literature. Write:

Celanese Corporation of America, Chemical Division, Dept. 558-G 180 Madison Avenue, New York 16, N. Y.

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Vinyl Acetate promises to revolutionize paint formulation

WATER-BASED PAINTS
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PROTECTIVE LACQUERS
PRIMER SEALERS
SEEPAGE SEALERS
METALLIC FINISHES
MASONRY PAINTS

Water-based paints have already gone "outdoors" on masonry—taking advantage of the fine adhesive and weathering properties of vinyl acetate resins. These new paints are durable, odorless, fast-drying. Vinyl acetate resins provide the needed film porosity for fresh plaster and efflorescing surface applications . . . give nitrocellulose lacquers increased clarity, gloss and adhesive qualities.

Celanese production of vinyl acetate monomer assures resin manufacturers dependable supplies of this basic chemical . . . offers the paint industry increased opportunities for product development and improvement.

John A. Lutz

John A. Lutz, Eastern Sales Mgr. Of Titanium Pigment Corp., Dies

John A. Lutz, eastern sales manager of the Titanium Pigment Corporation, National Lead Company, died suddenly on May 30, in Montclair, New Jersey. He was 46.

Mr. Lutz joined National Lead in 1935, when he was employed to investigate the use of titanium pigments in house paints. A year later he was transferred to the New York offices as an assistant in the Titanium Division's technical service department.

From 1936 to 1946, when he was appointed production manager of mixed paints, Mr. Lutz did technical service work. He was appointed manager of the Titanium Division technical service department in 1948 and eastern sales manager of Titanium in 1950.

•

Diamond Alkali Company Expands Facilities at New Jersey Plant

More extensive, centralized storage-and-handling facilities to serve Diamond Alkali Company customers in New Jersey, New York and surrounding areas have been completed and are now in operation at the company's Jersey City silicate plant.

The new construction provides 24,000 additional square feet of storage space for packaged chemicals. It consists of a steel frame-transite siding structure 200 feet long by 120 feet wide. A masonry wing, 21 feet by 52 feet, attached to the east end, houses the employees' locker room, lunch room, service quarters and office.

Hercules Powder Increasing Pentaerythritol Production

Expansion of the Hercules Powder Company's plant at Mansfield, Mass., to be completed at the end of this year, will increase the plant's pentaerythritol output from 18 to 24 million pounds annually.

According to Dr. W. M. Billing, general manager of Hercules' Synthetics Department, the expansion was brought about by increased demand for pentaerythritol in the paint and varnish industry. He said the increased production will be available by the end of the summer.

Although Hercules has its own captive use for pentaerythritol in the manufacture of its Penyalyn Resins, a greater portion of the current production is now being sold.

"All of the increased production resulting from the expansion project will be available for sale," Dr. Billing said.

During the academic year 1953-1954, the Department of Chemical and Metallurgical Engineering of the University of Michigan, Ann Arbor, Mich., will have three fellowships in Protective Coatings available to graduates in either the field of Chemistry or Chemical Engineering.

It will be possible for the recipient of these fellowships to take the work for the Master of Science degree in either Chemical Engineering or Protective Coatings depending upon his previous preparation. These fellowships, depending upon qualifications of those selected, will range in a stipend of $1500-$1800. Those interested in these fellowships, contact Prof. L. L. Carrick at the above address.

Amsco Solvents & Chemicals Opens Louisville, Ky. Office

The Amsco Solvents and Chemicals Company of Cincinnati, Ohio, has opened a branch office at 660 South Fifth St., Louisville, Ky.

Manufacturers in the area are invited to write or call the new office for details of its operation. The telephone number of the office is listed as Wabash 3393.

•

Celanese Begins Production Of Propylene Glycol U.S.P.

Propylene glycol U.S.P., a non-toxic proprietary solvent, is now being produced by the Celanese Corporation of America at its Bishop, Texas, plant.

The product will go into the same consuming fields as glycerin, and will be used as a replacement and extender for that important chemical in many applications.

Nuodex Products Names Van Tuin Company Exclusive Agent in Chi.

Nuodex Products Co., Inc., Elizabeth, F. N. J., has announced the appointment of the J. W. Van Tuin Company, 5349 West Lawrence, Chicago, as exclusive sales agent in that area for the firm's products used in the paint, varnish, and allied industries.

The Van Tuin company was formed by J. W. Van Tuin, who represented and served Nuodex in Chicago for nine years prior to 1949. Most recently, Mr. Van Tuin served as general sales manager for Nuodex at the firm's Elizabeth, N. J., offices.

•

Chlorinated Methane Products Plant To Be Erected in W. Va.

Plans for construction of a chlorinated methane products plant near Moundsville, West Va., have been announced by the Solvay Process Division, Allied Chemical & Dye Corporation.

Construction on the new plant is expected to be completed in ten months. Costs for the buildings and equipment will be more than 2 million dollars.

The plant will have facilities to produce methylene chloride, methyl chloride, chloroform and carbon tetrachloride.

Chlorine necessary for production of the products will be supplied by Solvay's chlorine-caustic soda plant now being completed on the Ohio River just south of Moundsville.

•

Brazilian Company Begins Phthalic Anhydride Production

Industria Quimica Produtes Ftalicos has announced the beginning of Phthalic Anhydride production in its Mogi das Cruzes plant in Brazil.

Present capacity is 30 tons per month, with increased output planned to coincide with the start of production in the company's new Phthalate Plasticizer plant.

•

Shepherd Chemical Appoints Boston Firm as Sales Agent

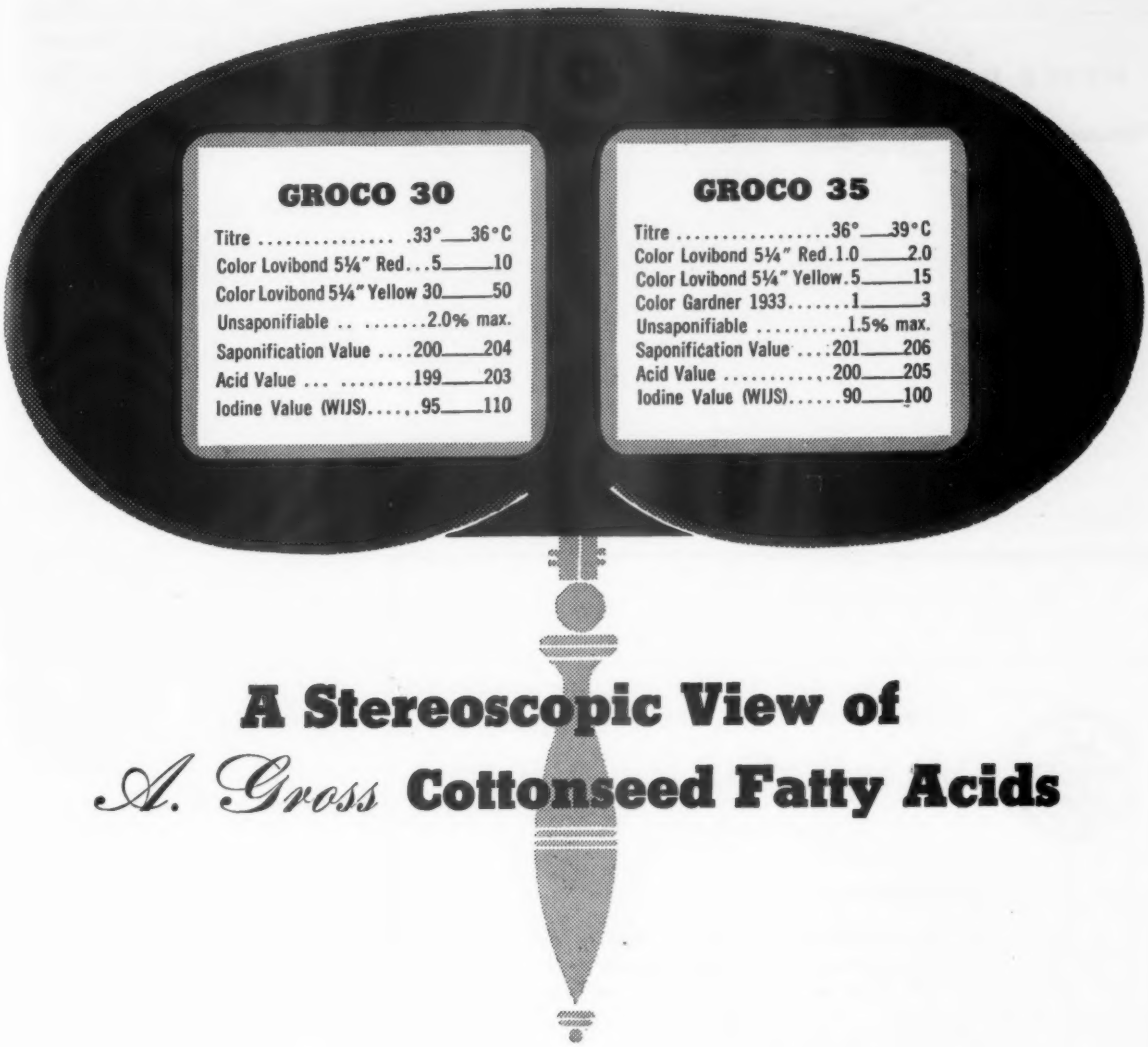
The Shepherd Chemical Company of Cincinnati, Ohio, has appointed the R. T. Freeman Company, Boston, Mass., as their representative for the distribution of driers, pigments and toners, and ceramic colors.

•

Furnace Black Plant To Be Built at Ponca City, Okla.

A plant designed to manufacture 40 million pounds annually of high abrasion furnace black will be built by Continental Blacks, Inc. at Ponca City, Okla.

Construction on the plant will begin immediately and is expected to be completed early in 1953.



A Stereoscopic View of *A. Gross* Cottonseed Fatty Acids

A. GROSS' distilled COTTONSEED FATTY ACIDS are recommended for the manufacture of soaps, polishes, insecticides, lubricating greases, alkyd resins, adhesives, buffing compounds, grease sticks and for the compounding of rubber.

The double distilled grade, GROCO 35, is tailored for use where exceptionally light color is essential, while the single-distilled grade, GROCO 30, is offered where high fatty acid content combined with a low price is desired.

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Troy Chemical Names Sales Agent for Canadian Territory

The Troy Chemical Company, 2589 Frisby Ave., New York 61, N. Y., has announced the appointment of the Pigment and Chemical Co., Ltd., Montreal, as their representative in Canada, with the exception of the city of Windsor.

Pigment and Chemical has branch offices in Vancouver, B. C.; Winnipeg, Manitoba, and Toronto, Canada.

Record 1953 Sales for Du Pont Industrial Finishes Predicted

Record sales for Du Pont industrial finishes this year were forecast by William P. Fisher, industrial manager, E. I. Du Pont de Nemours & Co., Wilmington Del., at the company's annual industrial finishes sales meeting held recently at the Marshall Laboratory in Philadelphia, Du Pont's research center.

"Although many economists and authorities on business conditions are predicting a slackening in manufacturing output as the year progresses, "Mr. Fisher said, "our barometer does not show this at present. Sales of our industrial finishes, embracing a range of more than 8,000 specialized compositions, to a cross section of industry have always proved to be a good indication of the state of business."

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LIGNOCOL®

Retards skinning in enamels, spar varnish and printing inks during storage and prevents wrinkling after the film has been cast. Particularly applicable in dipping tanks and industrial finishes where stubborn problems are encountered.

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Effectively inhibits skinning in paints, varnishes and printing inks and controls oxidation in putties and hydrocarbon solvents subject to gumming.

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A dibasic acid for use in the manufacture of alkyd resins and modified phenolic compositions and as a chemical intermediate.

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Organic Coatings Sessions To Be Held Aug. 17-21, in N. Hampshire

Organic coatings sessions, scheduled August 17-21, will be included in the Gordon Research Conferences for 1953, to be held from June 16 to September 4, at the New Hampton School, New Hampton, New Hampshire.

The Conferences, sponsored by the American Association for the Advancement of Science, were established to stimulate research in universities, research foundations and industrial laboratories.

Attendance at each Conference is limited to 100. Each applicant must state the institution or company with which he is connected and the type of work in which he is most interested.

Requests for attendance at the Conference, or any other additional information should be sent to W. George Parks, Director, Department of Chemistry, University of Rhode Island, Kingston, R. I.

Henry Grinsfelder will be chairman, and Lehman Hoag, vice chairman for the Organic Coatings Sessions.

Program details follow:

Monday, August 17

Basic Considerations Relating to the Kinetics and Extent of Cure in Vinyl Coating Materials, Sam Loshaek.

A Study of Film Splitting in Roller Coating Operations, John W. Swanson.

The Relationship of Theoretical High Polymer Chemistry to the Wrinkle Phenomenon, Harry Burrell.

Tuesday, August 18

Diffusion of Water and Solvents in Organic Films, Frank Long.

Electron Microscopy of Pigmented Films, Edward G. Bobalek.

Wednesday, August 19

Chemistry of the Organo-Titanium Compounds, D. F. Herman.

Utilization of Organo-Titanium Compounds in Coating Systems, H. H. Beacham.

Photosensitive Coatings, S. B. Elliot.

Practical Considerations of Relationships of Organic Coatings to Vacuum Metalizing of Plastics and Metal Surfaces, John Fletcher.

Thursday, August 20

Vagaries of Paint Testing, Ralph J. Wirshing.

Surface Adhesion (tentative), H. P. Meissner.

Observations of the Visco Elastic Behavior of High Polymers at Various Rates of Strain and Load Applications and Various Temperature Levels (Tentative), Albert G. H. Dietz.

Friday, August 21

Measuring the Gloss of Organic Coatings, G. N. Bruxelles.

NEWS DIGEST

F. L. Browne

P. O. Blackmore

R. I. Quigley

E. S. Johnson

Wood Finishing Covered at Forest Products Research Society Meeting

Wood finishing was one of the themes discussed at the 7th Annual Forest Products Research Society National Meeting held June 15-17, at Memphis, Tenn.

The wood finishing program, held June 16, was arranged by B. E. Clatworthy, Radio Corporation of America, Indianapolis, Ind., and included the following topics and speakers:

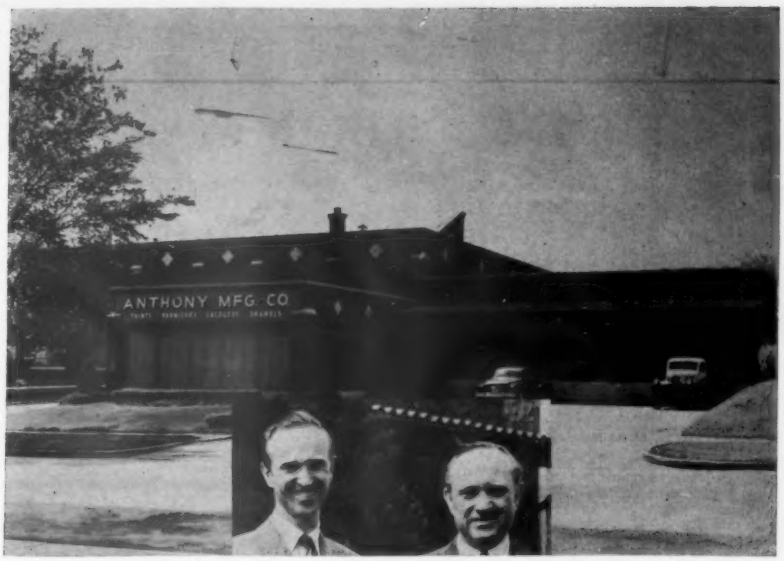
Solubility, Water Absorption and Swelling of Free Films of House Paint, Dr. F. L. Browne, Forest Products Laboratory, Madison, Wis.

Preparation of Wood for Finishing, O. B. Gordon, Behr-Manning Corp., Ill.

Factors Affecting the Integrity of a Furniture Finish, P. O. Blackmore, Director, Basic Development Laboratories Interchemical Corp., New York, N. Y.

Filler—The Theory and Techniques of Application, R. I. Quigley, Vice President, The Lilly Company, High Point, N. C.

Comparison of European and American Finishes, E. Siguard Johnson, Professor, North Carolina State College, High Point, North Carolina.



Anthony Manufacturing Company's recently purchased plant at 201 West Gregory Blvd., Kansas City, Mo. The plant will be used to service the firm's "Wear-N-Hide" products to dealers in Iowa, Nebraska, Minnesota, South Dakota, Kansas, Colorado, Oklahoma, Texas, Arkansas and Missouri. Inset: left, Jack Eichelberger; D. E. Eichelberger, company head. He has announced plans to change the firm name to the Anthony Paint Company.

Paint Industry Representatives Raise $315,000 at UJA Dinner

More than $315,000 for world-wide rescue, relief and rehabilitation was pledged by representatives of the paint, chemical and rubber industries attending their annual cooperative dinner of the United Jewish Appeal.

John Stanley Grauel, well-known Methodist minister, was speaker of the evening at the dinner, held recently at the Hotel Waldorf-Astoria.

Chairman of the paint industry drive for the UJA, Robert I. Wishnick, paid tribute to the industry leaders for their efforts to make the drive a success.

He mentioned by name his co-chairmen, Harry C. Soffer and Michael J. Merkin; the treasurer, William Wishnick; the associate chairmen, Lester Arnstein, Richard Hillman, Paul Kohnstamm, Burt Marcus, Seymour Meyer and James Weil, and the co-chairman of the special gifts committee, Ben Einhorn and Dudley D. Sherman.

•

Management Symposium on Sorbitol Held at Chicago

A management symposium on sorbitol, its logical position in the present economy, and its present fields of use was held at the Blackstone Hotel, Chicago, Ill., on May 20th.

Sponsored by the Atlas Powder Company, the symposium included a discussion on resins by Harold Rose, Director of Wood Finishes, Reliance Varnish Company, Louisville, Kentucky.

Hilton-Davis Names Sales Agents for New England & Mid-South Areas

The Hilton-Davis Chemical Co., a division of Sterling Drug, Inc., Cincinnati, Ohio, has appointed the Grant Chemical Company, Boston, Mass., as its sales representative to the protective coating industry in the New England states, and the Robert F. Sheahan Company, Memphis, Tenn., sales representative to the protective coating industry in the mid-South.

The Boston concern, with offices at 100 Boylston St., will distribute Hilton-Davis' line of flushed and dry colors to manufacturers in the paint and allied fields in Massachusetts, Maine, New Hampshire, Vermont and Connecticut.

The Sheahan firm will handle Hilton-Davis' color line in Tennessee, Arkansas, Alabama and Mississippi.

•

New York Paint Club Holds its Regular Outing at Neptune, N. J.

The New York Paint and Varnish Production Club held its regular Annual Outing at Jumping Brook Country Club at Neptune, New Jersey, on June 6, 1953.

Following the dinner, President E. Dale Albert, introduced the honored guests of the club, Gus Wescott, President of the Federation and James Lundy, Borough President of Queens.

The day's activities included a softball game, golf and various other athletic contests.

Both ways

the answer adds up

to Unitol

Most decisions by paint manufacturers to use Unitol are based on two considerations. It costs less. And it does the job—*well.*

Ask your research department for a current report on Unitol. You'll be impressed by the characteristics of today's improved product. Unitol rates higher than ever for color, uniformity, superior drying qualities. It is stable, non-crystallizing. Unitol is consistently low in price, consistently plentiful in supply.

Have you seen the new Unitol manual, "More Facts and Formulas for Coatings"? We will be glad to send you a copy.

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235 Broadway, New York 7, N. Y.

Aerosol Lacquers Discussed at Chemical Manufacturers' Meeting

Ways in which major problems are being solved in formulating top-quality aerosol lacquers were discussed by Dr. Fred S. Palmer of the Du Pont Company, before a meeting of the aerosol division of the Chemical Specialties Manufacturers' Association Conference held recently.

Such lacquers, including both acrylic protective coatings and pigmented sprays are expected to appear on the market in large quantities this year and may account for as much as five per cent of the industry's estimated 1953 production of 95 million units of "push-button" products.

Dr. Palmer, research chemist at Du Pont's Jackson Laboratory at Deepwater, N. J., outlined results of more than a year's research into nitrocellulose lacquer formulations. Aerosol application of products of that type, he pointed out, is particularly desirable because of the rapid drying rate and poor brushing characteristics usually associated with nitrocellulose finishes.

Quick-drying nitrocellulose aerosol lacquers are expected to capture a good share of the nation's home furniture-finishing market. They are clean, easy-to-use, and produce attractive professional-quality finishes without expensive compressed air spray equipment. Du Pont "Freon" fluorinated hydrocarbon, a liquefied gas which expands rapidly when released from pressure, provides the propellent force in most of the aerosol products.

Principal difference between conventional brush or spray lacquers and the aerosol types is the addition of a propellent to force lacquer from the can in a fine spray. As propellents, Du Pont's "Freon-12" dichlorodifluomethane and "Freon-11" trichloromonofluoromethane also serve as thinners in nitrocellulose lacquers, the Du Pont chemist explained.

Unlike "true" lacquer solvents, such as methyl ethyl ketone and methyl isobutyl ketone, the "Freon" fluorinated hydrocarbons will not dissolve nitrocellulose, and the quantity used must be carefully controlled to avoid precipitation of the nitrocellulose. The diluent action of the propellent requires use of a greater proportion of "true" solvents in aerosol formulations than in those intended for conventional methods of lacquer application.

A locked treasure chest was shown to sales representatives of the Martin-Senour Company at their January conference, but the contents were kept secret until judges of the "Diamond Trail Campaign," commemorating the firm's 75th anniversary, selected the winners. Opening the chest with its cash contents are, left to right: Don A. Seeley, manager of the M-S Automotive division; Earl Garman, treasurer; William M. Stuart, president, and J. R. Rawley, assistant to the president. Sales personnel who shared winnings were: C. C. Stuart, W. S. Bowers, George J. Pfeifer, R. S. Morris, E. L. Fortier, R. E. Sim.

Most lacquers, Dr. Palmer noted, use nitrocellulose and a modifying resin as the film-forming material. In high durability finishes like automotive lacquers, the modifying resin usually is a non-oxidizing alkyd resin. Permissible proportion of propellent is less with the latter than with nitrocellulose.

Spray characteristics of an aerosol coating composition, he said, are affected "very markedly" by the consistency of the material. Normally, consistency is controlled by selection of types and amounts of various ingredients and, in this respect, aerosol products are not essentially different from those intended for application by other methods.

A concentration of 40 per cent "Freon-12" dichlorodifluoromethane gives pressures of 40-45 pounds per square inch (gauge pressure) with both methyl isobutyl ketone-base and butyl acetate-base lacquers, Dr. Palmer said. Since such formulations contain 25 per cent solids, that is about the maximum pressure obtainable because of the limited compatibility of higher concentrations of propellent. As the solid content is lowered, however, the concentration of propellent can be increased slightly.

When an 80/20 solution of "Freon-12" and "Freon-11" trichloromonofluoromethane is used as the propellent, a 55-60 per cent concentration of propellent gives pressures of 45-50 pounds per square inch. That concentration, he noted, is the maximum which can be used in the methyl isobutyl ketone-base lacquers.

While a formulation which sprays well usually gives good coatings, the properties of various lacquer films depend upon the behavior of their ingredients after application.

Rapid evaporation of lacquer solvents as the coating dries, for example, causes a cooling effect which may condense moisture from the air on a freshly applied lacquer coating. This causes the film-forming materials to precipitate in a granular or discontinuous condition, known as "blushing", which impairs the appearance, strength, clarity, and other properties of the film.

This cooling is exaggerated in the aerosol method of applying lacquers, Dr. Palmer explained, because the propellents increase the evaporation rate. Blushing can be avoided, he said, by adding a small amount of high-boiling solvent to the formulation so that in later drying stages any precipitated material is redissolved and blended into the final film.

Other defects which must be watched are bubbles and craters, orange peel, lifting, and color change during storage.

Bubbles and craters in aerosol lacquer coatings, the Du Pont chemist explained, most often result from an improper solvent balance. This defect can be avoided by using a high-boiling

solvent in the formulation to impart flow to the coating in final drying stages. Excessively heavy coatings also should be avoided.

Careful control of viscosity and propellent compatibility are required to prevent orange peel imperfections.

Lifting—caused by softening of the first coat when a second is applied over it—is more pronounced in lacquers containing high concentrations of strong solvents, he said. Although a "rich" solvent is desirable for increasing propellent compatibility in aerosol lacquers, careful adjustment of the solvent balance is required to minimize lifting.

Propellents used in aerosol lacquer formulations do not affect gloss or color stability of finishes. Some cases of yellowing of aerosol lacquers during storage have been reported, especially among the white lacquers. While such defects are not peculiar to aerosols alone, it is recommended that the steel balls, normally placed in aerosol coating packages to help agitate the solids, be replaced with porcelain, glass, or stone balls, Dr. Palmer said.

●

Navy To Curtail its Manufacture of Paints; Procure from Ind'y.

Secretary of the Navy Anderson announced May 29 that the Navy will curtail its manufacture of paints and procure most of its needs from private industry in the future. Hereafter the Navy will procure from commercial sources all paint not used on ships and all paint used on ships which can meet mandatory manufacturing formula or performance type specifications that assure adequate quality.

Navy paint factories at Mare Island, California, and Norfolk, Virginia, will be restricted to the production of paint which is of such composition or purpose that adequate quality control cannot be maintained at commercial sources without undue administrative difficulty and expense. While not specifically mentioned in the order, it is understood that the Navy will continue the manufacture of ship bottom, hot plastic and fire retardant paints.

The Navy factories will also be permitted to manufacture paint for research and development purposes and for use on ships only where the quantities are so small that commercial procurement is uneconomical or impractical. Such manufacturing operations must be justified to the Navy Department.

The Chief of the Bureau of Ships will issue a list of paints which can be commercially procured under provisions of the new policy. The Bureau also will make periodical studies to determine if its paint manufacturing activities can be further curtailed through the establishment of adequate specifications, qualified products lists, or other procedures.

This action by the Navy is the result of insistence by the Association that paint manufacturing operations be discontinued. While a great deal has been accomplished by the order issued, further effort will be made to discontinue entirely the manufacture of paints by the Navy.

June 12 Hearing:

At a hearing on June 12, before the House Sub-Committee on Intergovernmental Relations, the National Paint, Varnish and Lacquer Association urged cessation of paint manufacturing operation by the navy.

Daniel L. Boland, general counsel of the Association, testified that while the May 29th announcement by the Secretary of the Navy curtailing paint manufacturing was gratifying, it did not go far enough to satisfy the paint industry.

The NPLVA urged complete withdrawal by the navy from the manufacture of paints and allied products, dismantling of its existing plants at Norfolk and Mare Island, the sale of the paints paint making equipment to private industry, and the disposal of present inventory stocks on the open market, and the continuance and expansion of the research and development laboratories and staff.

Meanwhile the navy general stores supply office, Philadelphia, announced recently that invitations soon will be mailed to commercial paint producers to bid on supplying the navy with 147,000 gallons of paint.

Chats about Finishes

NEW LACQUER ADDITIVES RETARD ULTRAVIOLET WOOD DISCOLORATION

by

JAMES R. YEAGER

Manager of
Market Development—Coatings
Hercules' Cellulose Products Dept.

The increasing popularity of light-colored shades of wood furniture has made the problem of discoloration even more important. Recent investigations have substantiated the generally accepted idea that the major cause of wood darkening is the ultraviolet portion of sunlight. A study was made of many additives to determine which would effectively filter the damaging light rays that cause wood discoloration. The additives were incorporated in heat- and light-stable lacquers.

Of the ultraviolet-light absorbers tested, two materials with a marked degree of effectiveness were found. These materials, when used in colorless lacquers, retard the darkening of many woods. We will be glad to supply you with more complete details on this new lacquer development. Write me or your nearest Cellulose Products sales office.

James R. Yeager

Cellulose Products Department
HERCULES POWDER COMPANY
INCORPORATED
926 Market Street, Wilmington 99, Del.

1C53-5

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Four of these gauges, one at each end of the slow and fast rolls, make it easy to set roll pressures accurately.

This gauge shows pressures applied to the take-off knife. It is part of the pneumatic discharge control that assures optimum pressure for efficient take-off.

Sight-O-Matic Control, as incorporated in the Lehmann Model 631-V Three Roll Paint Mill, governs roll pressures through four gauges, one at each end of the slow and fast rolls. These gauges, connected to the mechanical adjustment system through pressure units which actuate the movement of the dial needles, show the operator instantly the effects of adjusting the hand wheel at that end of the roll. Independent adjustment of the slow and fast rolls permits a differential in pressure between the feed roll setting and the take-off roll setting.

The gauges enable him to equalize the pressure and maintain uniformity of grind along the entire face of the roll. Roll adjustments can be made quickly and accurately without the liability to human error so common with the slower "trial and error" methods of adjusting roll pressures that put such a high premium on the skill of the operator.

Sight-O-Matic Control, taken together with pneumatic discharge control, drive tension adjustment, dial indicating thermometers on water inlet manifold and at each of the roll water outlets, extra deep hopper and other roller mill refinements, contributes to a substantial increase in paint mill capacity.

Send for further information.

*Reg. U. S. Pat. Office

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NEW MATERIALS & EQUIPMENT

A MONTHLY MARKET SURVEY

This section is intended to keep our readers informed of new and improved products. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.

CENTRAL SAFETY

DRUM SAFETY VENT

Controls, Prevents Explosions

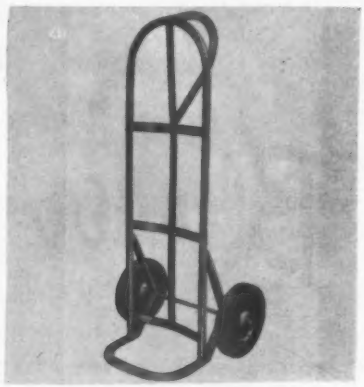
Safety valve is designed to control and prevent explosions caused by pressure expansion in 50 gallon metal drums containing flammable liquids. Approved by Factory Mutual Laboratories. Approval covers drums containing all flammable liquids with the exception of carbon disulphide and diethyl ether.

The unit is screwed into bung opening of standard 50 gallon metal drum by hand. Has six automatic actions: permits entry of air into when liquid in drum contracts or is being withdrawn; allows air to escape slowly when normal temperature causes the liquid to expand; relieves excess pressure quickly when fire or unusual heat causes liquids to build up vapor pressure; automatically resets and shutsoff flow of vapor as soon as pressure is relieved; fire screens inside vent prevent entry of fire into the drum; should drum turn over, unit automatically seals off all flow of vapor and liquid. Central Safety Equipment Co., 2201 E. Huntington St., Philadelphia 25, Pa.

HAND TRUCK

With Beveled Nose

Wheel-Ezy hand truck has a rugged handle mounting and beveled nose that slides under materials easily. Trucks are available with steel, Durastan Resinoid, or a choice of five types of rubber wheels. The "knitted frame" construction provides strength without bulk for loads up to 500 pounds. The Rapids-Standard Co., Inc., 342 Rapistan Bldg., Grand Rapids 2, Mich.



RAPIDS-STANDARD

AMIDE GELLATOR

Used as Suspending Agent

Organic amide, specifically, N-laurylm N_1-lauryl adipamide will produce soft, pliable gels of excellent stability. Because of the high polarity of the gellator, its gels have been found to have excellent adhesion properties, and rust inhibiting and water resistance characteristics. In all concentrations gels are free from bleeding, and the thickener, because of its organic nature, shows no tendency of settling out from any organic media it is despersed in. Because of these gelling qualities, this base shows promise as a suspending agent for pigments in oil or solvent materials as well as adding to the material's body. Swan-Finch Oil Corp., 338 Hudson St., Hackensack, N. J.

VINYL PLASTICIZER

Epoxydized Soybean Type

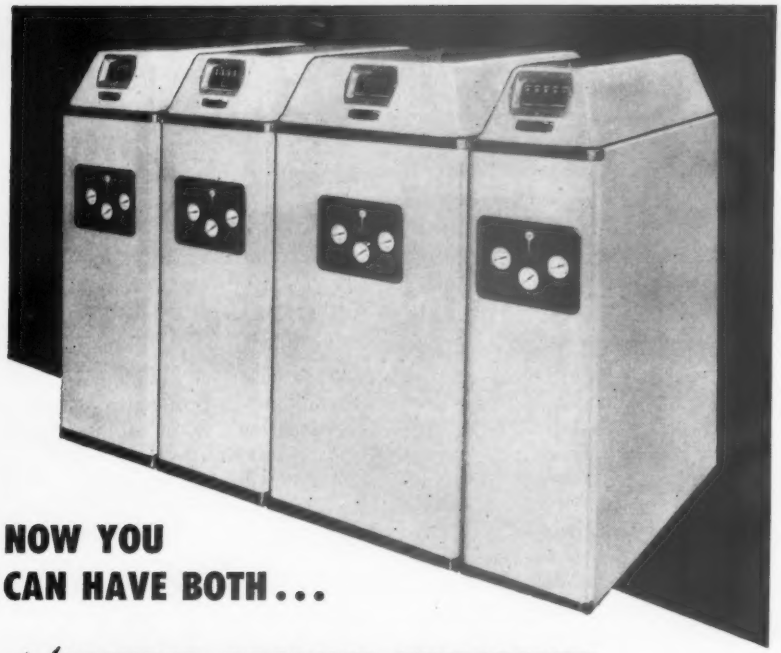
Plasticizer is claimed to have the following properties: non-volatility, low extractability, good mill behavior, good low temperature flexibility, excellent ultraviolet resistance, excellent heat resistance, low viscosity, good stabilizing properties. Odorless and light colored. Recommended in flexible sheeting, plastisols and organosols, molding and extrusion compounds. Pilot plant samples are available for evaluation. Archer-Daniels-Midland, Minneapolis, Mich.

DUPLEX HEATER

Transformer Controlled

Transformer controlled heater assembled with ASTM Pensky Martens shield, cap and cover in one unit. According to the manufacturer, all details of construction meet ASTM D-93 requirements. Recommended for determining flash points of fuel oils; also suitable for gas oils and soy-bean oils. Equipped with reflector type heating element claimed to afford accurate heating rates. Labline, Inc., 217 N. Desplaines St., Chicago 6, Ill.

LABLINE



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Automatic Blender

Wherever you have to accurately measure and blend two or more liquids with positive uniformity, the Bowser Automatic Blender is the most economical and accurate answer.

Simple, quick-setting controls permit instantaneous setting of ingredient proportions. Double handling and large storage facilities for blended stocks are eliminated . . . and, important, liquids can be blended as needed.

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NEW MATERIALS — EQUIPMENT

FLUORINATED RESIN
Non-Flammable

Exon 400 XR-61 is a non-flammable, which according to the manufacturer, is inert to inorganic chemicals, heat and light. It is soluble in selected organic solvents, which permits spreading, dipping, spraying or direct brush applications to metal, wood, plastics, textiles, asbestos and paper. Solutions of this particular resin can be used to impart water resistance to materials that are sensitive to water such as paper, wood, textiles, etc. Metal containers, such as tin cans, can be coated so as to give protection from concentrated sulfuric or nitric acid. Exon 400 XR-61 can be applied to iron, wood, concrete or other reaction vessels or tanks to permit their use in certain chemical processes as a replacement for glass or stainless steel, etc. According to claims made by the manufacturer, metal strips coated with Exon 400 XR-61 can be boiled for 10 days in 3 percent salt water with little sign of attack. Coated steel panels resist salt water spray for over 300 hrs.

Solutions of Exon 400 XR-61 can be made up to 40 percent concentration. A 20 percent cyclohexanone solution will have a viscosity of 5 to 6 poises. Mixtures of solvents such as toluene and methyl ethyl ketone appear to be better than either solvent alone. For cutting down the volatility, cyclohexanone or xylene is recommended. For diluents, turpentine, VMP naphtha, and butyl alcohol may be used.

This resin (presently in the pilot plant stage) is available in any quantity up to 400 lbs. per month. Firestone Plastics Co., Pottstown, Pa.

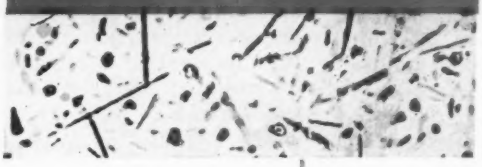
EXTINGUISHER INDICATOR
Records Capacity

Bracket indicator with built-in scale gives a constant recording of the 2½ to 20 lb. charge condition of carbon dioxide fire extinguisher. Once the unit is adjusted to a full container, it can be calibrated with a screw driver. National Equipment Distributors Co., 31 Milk St., Boston, Mass.

high

AZO ZZZ-22

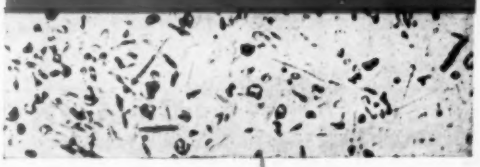
A high oil absorption Zinc Oxide having large Acicular Particles which gives heavy body



medium

AZO ZZZ-11

A medium oil absorption Acicular Zinc Oxide imparting exceptional weathering qualities to exterior paints

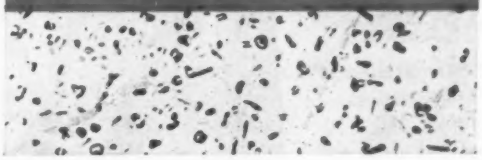


AZO acicular lead-free zinc oxide is a superior pigment available in a wide range of oil absorptions

low

AZO ZZZ-33

A definitely Acicular type with a lower oil absorption, but chemically identical with AZO ZZZ-11 and AZO ZZZ-22



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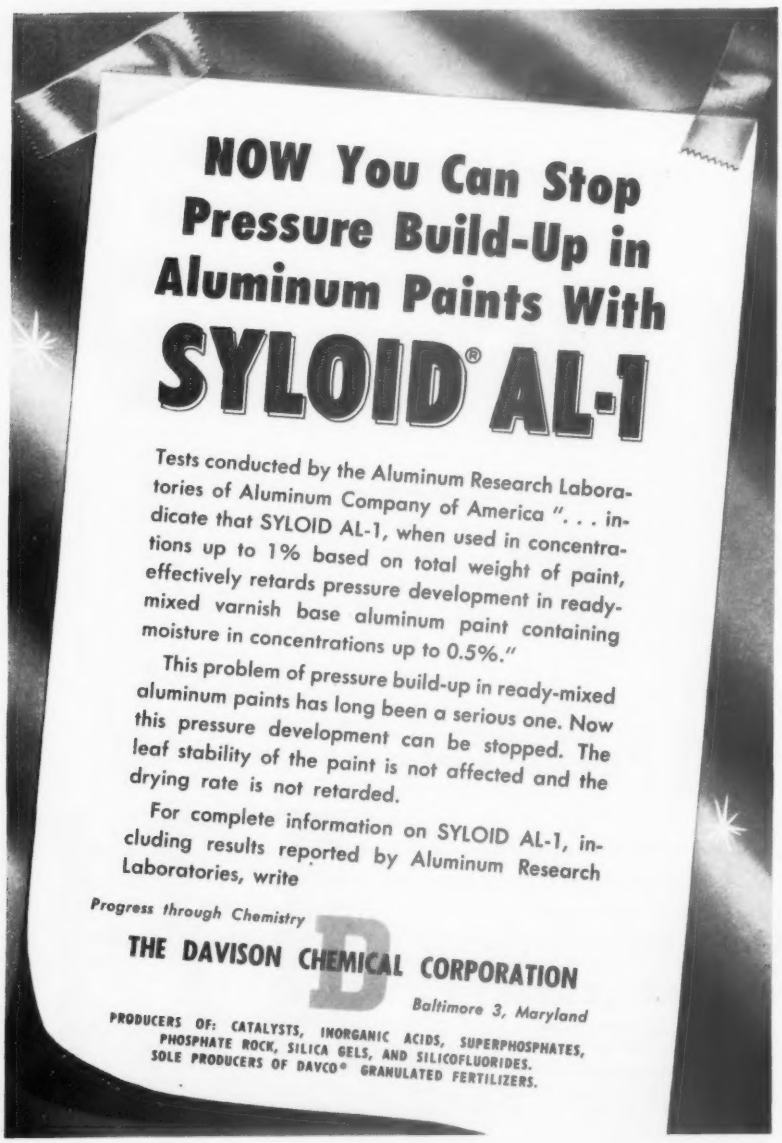
NEW MATERIALS — EQUIPMENT

CONJUGATED SAFFLOWER
Fast Drying

Safflower 22 is a conjugated oil which retains all of its desirable properties such as color, color retention and flexibility. According to the manufacturer, faster drying speed and a much faster polymerization rate has been added. This product is safflower oil (containing about 75 percent linoleic glycerides) catalytically isomerized to an oil of 22 to 24 percent conjugation. It is claimed that safflower oil lends itself ideally to this process because it contains very low amounts of saturated glycerides and little or no linolenic glycerides, a factor which gives it excellent non-yellowing and color retention properties.

Properties of Safflower 22 claimed are: dries to a gloss film approximately twice as fast as unbodied safflower or linseed oil; exhibits wrinkling characteristics similar to tung and dehydrated oil when used without driers or with surface drying catalysts, and thus may be used in wrinkle finishes; polymerizes twice as fast as catalyzed linseed at same bodying temperature; open kettle bodying of this oil produces polymers of satisfactorily low acid value because of speed of reaction (vacuum process equipment is not needed); faster bodying rate is carried into varnish cooking resulting in shorter cooking time, improved color and dry; alcholizes as easily as refined safflower and can be used in the manufacture of alkyds; wets pigments and makes good grinding media; because of fast drying speed, it may require addition of inhibitors, a smaller percentage of driers or a slower solvent structure; may be used in the manufacture of maleated oils and styrenated products.

For complete details write to Pacific Vegetable Oil Corp., 3135 E. 26th St., Los Angeles 23, Calif.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Tests conducted by the Aluminum Research Laboratories of Aluminum Company of America ". . . indicate that SYLOID AL-1, when used in concentrations up to 1% based on total weight of paint, effectively retards pressure development in ready-mixed varnish base aluminum paint containing moisture in concentrations up to 0.5%."
This problem of pressure build-up in ready-mixed aluminum paints has long been a serious one. Now this pressure development can be stopped. The leaf stability of the paint is not affected and the drying rate is not retarded.
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PLASTICIZER
Monomeric Type

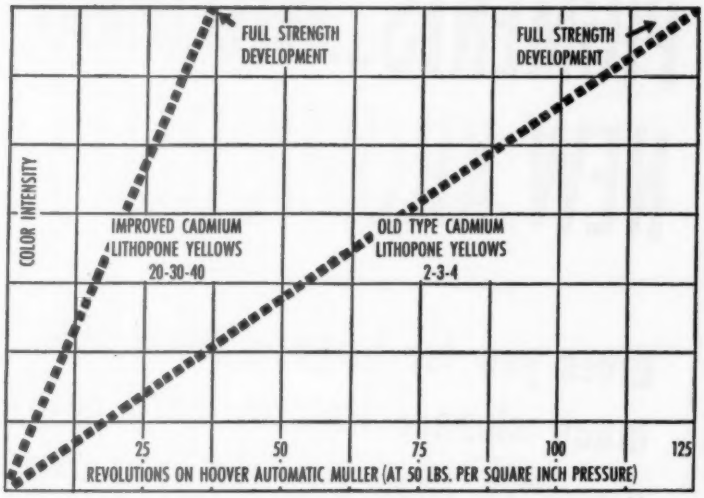
Plastolein 9057 DIOZ (di-isooctyl azelate) is a primary, monomeric plasticizer for vinyls, celluosics, and synthetic rubbers. According to the claims of the manufacturer, this plasticizer possesses the desirable properties of efficiency, compatibility, and permanence, and imparts low-temperature flexibility. Applicable to vinyl calender sheeting, calender and cast film, calender and dispersion coated fabric, extruded products, and Plastisol formulations. Emery Industries, Inc., Dept. 5, Carew Tower, Cincinnati, Ohio.

MIXER-MULLERS
Two Models

Line of mullers is designed to mix dry, semi-dry and pasty materials. Type F. models are equipped to afford a wide range of adjustment. Spring-loading arrangement transmits controlled tension through the comparatively light mullers to the material being mixed. Models 2F and 3F have batch capacities of 30 and 60 cubic feet respectively. Used wherever controlled milling is required to maintain uniform dispersion of pigments or plasticizers. Simpson Mix-Muller Div., National Engineering Co., 549 Washington Blvd., Chicago 6 Ill.

Harshaw Cadmium Lithopone YELLOWS

Readily Dispersible



The above chart illustrates one of several tests demonstrating the outstanding improvement recently made in the texture of Harshaw Cadmium Lithopone Yellows. Owing to their increased dispersibility and decreased tendency to flocculate, they can be rapidly incorporated in all types of vehicles, including latex and alkyd emulsion systems. The surfaces of these inorganic yellow pigments are wetted equally well by aqueous and organic vehicles, an important factor contributing to the stability of emulsion paints.

The chemical and heat resistance of cadmium yellows combined with their complete insolubility make them excellent for use in plastics, printing inks and industrial finishes.

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AVAILABLE IN THREE BRILLIANT SHADES

CADMIUM LITHOPONE PRIMROSE #20 **CADMIUM LITHOPONE LEMON #30**
CADMIUM LITHOPONE GOLDEN #40

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Send for color folder showing complete line of Cadmium Lithopone Yellows and Reds

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Fe_2O_3	95.0% MIN.
Sp.G.	4.80
Oil ABS.	21-22
Hiding SQ. FT. per LB.	850-1,000

KROMA RED applications:

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- Automotive finishes
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. . . and many other uses.

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NEW MATERIALS — EQUIPMENT

DRYING AGENT
Non-Metallic

Ortho-phenanthrolene, an organic compound, exerts a polymerizing effect on coating materials. According to the manufacturer, this compound when used in paints and inks decreases the amount of scarce or critical metallic driers required. Another advantage claimed is that it does not lose its drying power on aging. R. T. Vanderbilt, 230 Park Ave., New York, N. Y.

PLASTICIZER
Hydroscopic

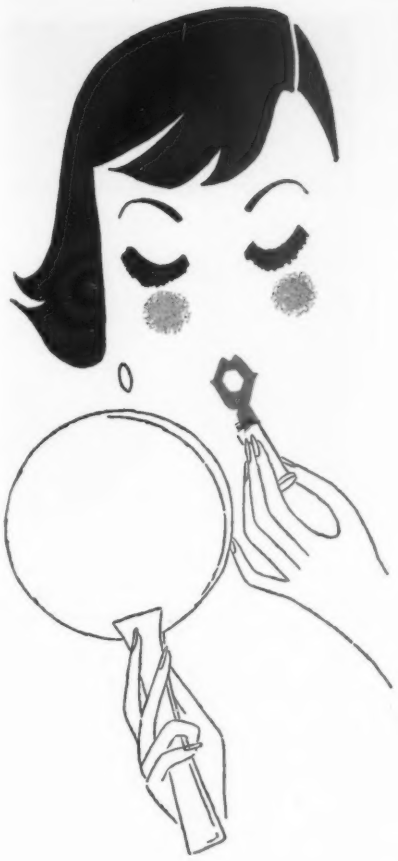
Bifunctional plasticizer, known as "Retane", is said to maintain even moisture control, but also plasticizes the materials it is used with as well. It is non-volatile and this characteristic enables its use within heat ranges which would volatilize most materials now commonly employed. It is non-toxic and non-corrosive. Bonner Chemicals, Inc., 31 Spruce St., Leominster, Mass.

HYDRAULIC LIFTS
Manual or Battery Operation

New models of "Big Joe" hydraulic lifts is said to have many functional improvements that increase the ease of handling bulkier loads with even greater safety. These include straddle type base, forks adjustable in any position, swivel casters, dual ground gripping brakes, optional remote control unit on battery models. Big Joe Manufacturing Co., 900 W. Jackson Blvd., Chicago 7, Ill.

MELTING POINT APPARATUS
Used for Softening Pt., Also

Slide and pointer arrangement is said to allow operator to determine melting points with rapidity and ease. Arched construction of assembly gives clear view of the bar and pointer at all times. It is used for chemicals which have a distinct melting point and for the determination of softening or melting points of other temperature-sensitive materials such as waxes, resins and gums. Parr Instrument Co., 211 53rd St., Moline, Ill.



the right pigment gets results

Experienced paint formulators are even more carefully selective than this young lady in choosing her "war paint".

That's why they prefer TITANOX titanium-calcium pigments. For these pigments embody the most efficient and reliable combination of titanium dioxide with extender . . . and in different types of pigment to meet different needs:

TITANOX-RCHT (30% TiO_2; general purpose)
TITANOX-RCHT-X (30% TiO_2; easy mixing)
TITANOX-RC (30% TiO_2; "non-chalking")
TITANOX-C-50 (50% TiO_2)

Selecting the right pigment for your job is the only way to assure maximum benefits from titanium pigments. An extensive research program and broad experience in paint formulation puts our Technical Service Department in an excellent position to help you with this selection. Titanium Pigment Corporation, 111 Broadway, New York 6, N.Y.; Boston 6; Chicago 3; Cleveland 15; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 9, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments Limited, Montreal 2; Toronto 1.

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FROM COLOR TO CLEAR

FROM ONE LOCATION TO ANOTHER...

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get the facts—

SHARPLES

THE SHARPLES CORPORATION
2300 WESTMORELAND STREET, PHILADELPHIA 40, PENNA.
Overseas Companies and Representatives throughout the World

Personnel Changes

Edgar V. Burns

Dr. J. R. Skeen

NUODEX

Edgar V. Burns has been appointed promotion manager. He was formerly assistant to the advertising manager, which position he has held since joining Nuodex in 1948. In his new position, Mr. Burns will be in charge of all promotional activities including advertising, direct mail, and sales literature.

Dr. John R. Skeen, vice-president in charge of research and development, has been elected a director of the company.

COMMERCIAL SOLVENTS

Robert A. Mohrman has joined the sales staff of the Industrial Chemicals Department of the company. He will work out of the New York District Office. Mr. Mohrman was formerly with the Barrett and Nitrogen Divisions of Allied Chemical & Dye Corporation and with the Bordon Company. A Penn State University graduate, he served four years with the U. S. Signal Corps in World War II.

R. A. Mohrman

PUBLICKER INDUSTRIES

Arnold H. Davidson has been appointed New England sales representative for Publicker Alcohol and Chemical Sales Corp. He has been associated with the firm five years, mostly at the home office in Philadelphia.

MATHEWS PAINT

George Purdy has been appointed territory salesman in Southern Nevada and San Bernardino and Riverside Counties in California. Most recently he was with the Palico Products Company.

G. C. Miller

H. B. McClure

C. W. Blount

H. K. Intermann

U.C.C. DIVISIONS

George C. Miller has been appointed president of the Bakelite Company. He succeeds **H. S. Bunn,** vice-president of Union Carbide, who now succeeds the late J. W. McLaughlin as chairman of Bukelite and as a member of the of Bakelite and as a member of the Appropriations Committee of Union Carbide. Mr. Miller became associated with Union Carbide in 1922, and was most recently vice president in charge of sales at Bakelite.

Harry B. McClure has been appointed executive vice-president of Carbide and Carbon Chemicals Company. He had been vice-president since 1944. Mr. McClure joined Carbide in 1928 as a research fellow at Mellon Institute of Industrial Research in Pittsburgh.

C. W. Blount has been appointed vice president in charge of sales of Bakelite and **H. K. Intemann** has been named vice-president and general sales manager. Mr. Blount succeeds George C. Miller who was named president of the firm. Mr. Intemann succeeds Mr. Blount.

KOPPERS CHEMICAL

H. C. Carlson has been appointed chemical products manager of the sales department of the Chemical Division. He joined Koppers as a cadet engineer at the Follansbee, W. Va., plant of the Tar Products Division in 1932. Most recently he served as Midwestern District Sales Manager. Succeeding Mr. Carlson as Midwestern District Sales Manager is **L. R. Hunter,** former Pittsburgh district sales representative of the Chemical Division. Mr. Hunter became affiliated with Koppers in 1947 as a foreman in the Kobuta plant at Monaca, Pa.

NAUGATUCK CHEMICAL

Dr. W. F. Tuley has been appointed group manager of product development and technical sales service. Formerly technical director of rubber chemicals and synthetic rubber development, he joined the firm's general laboratories in 1928.

Dr. L. H. Howland has been named manager of synthetic rubber development. He joined the company's general laboratories in 1928. Most recently, Dr. Howland was manager of GR-S research and development.

Dr. P. M. Elliott has been appointed manager of plastics development. He joined the company's general laboratories in 1937, and transferred to Naugatuck Chemical two years later.

F. L. Holbrook has been named manager of rubber chemicals development. He joined Naugatuck in 1931.

GREAT LAKES CARBON

De Otis L. Marlett has been elected vice-president of the firm, and general manager of the Dicalite and Perlite Divisions. Mr. Marlett came to Great Lakes Carbon in 1952 from the Bonneville Power Administration, where he had served for almost twelve years. For his service there as assistant administrator for seven years, and for his activity in organizing the Defense Electric Power Administration, he was awarded the Distinguished Service Medal of the Department of the Interior.

D. L. Marlett

• Every now and then a bad batch will go through. Maybe agglomerates were caused by faulty raw materials, or improper setting of the grind. Sometimes a run is contaminated by dirt or other foreign matter.

There's no need to throw that batch away—or ship it and hurt your reputation. You can salvage seedy batches by running them through a Cuno MICRO-KLEAN filter.

Here's what MICRO-KLEAN does for you:

• gives positive removal of all oversize pigments and contaminants.

• provides greater filter capacity for uninterrupted running of larger batches.

• handles #5 grind and up, removing seeds and particles not touched by a centrifuge.

Find out today how the economical, easily installed MICRO-KLEAN can save you money. Write to Cuno Engineering Corp., Dept. 2812-M Meriden, Conn. M.3.12

CUNO ENGINEERED FILTRATION

3M

Dr. Mathew W. Miller has been named business manager of the Central Research Department, and **Dr. Alvin M. Borders** and **Dr. Harold M. Scholberg,** have been named associate directors of the Department. Mr. Miller joined 3M as a research chemist in 1947. His most recent position was as assistant director of the department. Dr. Borders was formerly associated with the Institute of Paper Chemistry, from 1948 until 1950, when he joined 3M. Dr. Scholberg will head the physics, inorganic chemistry and physical chemistry sections of Central Research. He joined 3M in 1944.

ARIZONA CHEMICAL

Albert Scharwachter has been elected vice-president. He had been sales manager for several years. Mr. Scharwachter, who was recently re-elected president of the Tall Oil Association, became associated with American Cyanamid Company when it acquired A. Klipstein & Company in 1931.

H. Douglas Spruance has been named technical sales representative for the mid-West. Mr. Spruance, whose headquarters will be at American Cyanamid's office and warehouse at 3505 N. Kimball Ave., Chicago 18, Ill., will service customers in Michigan, Illinois, Minnesota, Wisconsin, Iowa and Missouri.

C. W. Grubb

H. M. Brubaker

WITCO

Charles W. Grubb has been named sales manager for the New England states with headquarters in Boston. Mr. Grubb, who has been a salesman in the Boston office for three years, succeeds Goodwin Bangsburg.

Harry M. Brubaker has been promoted from assistant sales manager to sales manager of the Carbon Black Division. He joined the firm about two years ago.

ATLAS POWDER

Ralph K. Gottshall has been elected president, and chairman of the executive committee. Mr. Gottshall succeeds **Isaac Fogg,** who was named chairman of the board, and will also remain chairman of the finance committee. Mr. Fogg succeeds **Leland Lyon** as chairman of the board. Mr. Lyon, who will remain as a member of the board, has been its chairman since 1945, following his retirement from the presidency of the company. Mr. Gottshall had been a director and member of the executive committee since 1951. He joined Atlas Powder in 1927 as a paint chemist.

R. K. Gottshall

W. G. Frome has retired as vice-president and as member of the board and executive committee. **D. J. C. Copps** has been elected to the board and to the executive committee.

VALSPAR

George T. Elser has been elected vice president in charge of production. Prior to joining the Valspar Corporation Mr Elser who has had more than 2 years experience in paint manufacturing, was vice president and general manager of the Benjamin Franklin Division, Sears Roebuck & Co.

ROSS & ROWE

Oscar M. Stout has been elected treasurer, succeeding E. J. McAuley. He has been with the company fifteen years. **Mrs. D. E. Appelt** was named secretary.

R-B-H dispersion methods . . . which provide reduction of agglomerates and complete wetting of the pigment . . . offer the ultimate in gloss in a pigmented vinyl coating.

Sixty-one dispersions are available to you from the R-B-H standard line . . . every pigment suitable for use with vinyls.

R-B-H . . . *for finishes of integrity.*

R-B-H Dispersions

DIVISION OF INTERCHEMICAL CORPORATION
DISPERSION TECHNICIANS
BOUND BROOK, NEW JERSEY

Pigment dispersions in nitrocellulose; ethyl cellulose; urea formaldehyde; vinyl and alkyd resins; chlorinated rubber and other plastic binders.
R-B-H IS A TRADE-MARK OF INTERCHEMICAL CORPORATION

MANSFIELD PAINT

John W. Culler has been appointed chief chemist of the firm, heading the research and development laboratories at Mansfield. Mr. Culler received his scientific education at Ohio State University and Wayne University, Detroit. His address will be at 10 Glenwood Blvd., Mansfield, Ohio. Mr. Culler was formerly with Dibble Color Company, a division of Pratt & Lambert, in Detroit.

J. W. Culler

SAPOLIN PAINTS

Edward Salas has been appointed Advertising Manager. Prior to his appointment, Salas served for eight years as Advertising Manager for Nuodex Products, Inc., Elizabeth, N. J., manufacturers of special purpose chemicals for the paint & allied industries. Mr. Salas, who resides at 10 Romore Place, Cranford, N. J., is a graduate of New York University. He is a member of the Board of Directors of the Kiwanis Club.

Edward Salas

BRADLEY PAINT

E. R. Hollinger has been named director of the firm's Furniture Finishes Division. He will be in charge of sales and technical operations of this division. Mr. Hollinger has worked on finishes and finishing problems with furniture and cabinet manufacturers for more than 18 years. Most recently he was technical director of the Los Angeles Paint, Varnish and Lacquer Laboratory of the Sherwin-Williams Co.

E. R. Hollinger

MINDAR CORP.

John R. Lyons has been appointed technical representative for the company. He was formerly employed by the Pacific Chemical and Fertilizer Company as a technical representative and prior to that, as an analytical chemist in the Quality Control Laboratory of U. S. Gypsum Company.

CONTINENTAL CAN

John G. Murray and **Peter P. Wojtul** have been elected vice presidents. Mr. Murray, formerly general manager of Bond Crown & Cork Co., a Continental subsidiary, will continue to head the firm's operations in Wilmington, Del. Mr. Wojtul, who was named director of sales last January, will be in charge of sales for all product divisions, including the metal, paper container, fibre drum, crown and cork, and bag divisions. Mr. Murray joined the firm's general manufacturing department in New York in 1929. Mr. Wojtul joined the company in 1927 in the Chicago plant.

Thomas J. Hughes has been named district sales manager for Continental Can's newly created Paterson sales district, Metal Division. Mr. Hughes has been with the firm since 1947.

John P. Bertram, Jr. will be sales officer the district sales office being opened at Getty Ave. and Thomas Street, Paterson, N. J.

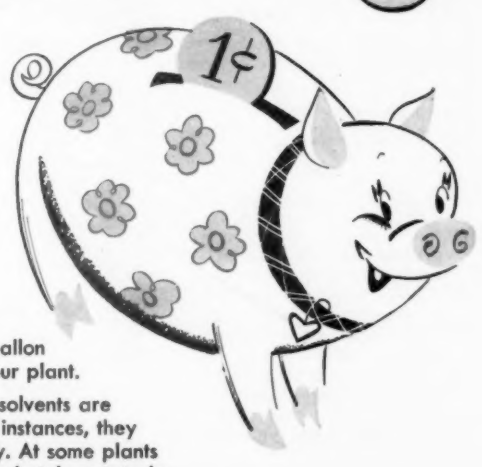
OLO PAINT

Edward R. Van Cleef, executive vice-president, has been elected president. He succeeds **A. J. Frank,** who has been named secretary and treasurer of the company.

EASTMAN
INDUSTRIAL CHEMICALS

isobutyl acetate

OPERATION PIGGY BANK



A total or even a partial replacement of normal butyl acetate with Eastman isobutyl acetate can add a cent or two to your profit column every time a gallon of lacquer moves through your plant.

The properties of these two solvents are so nearly alike that, in most instances, they can be used interchangeably. At some plants we're making deliveries of isobutyl acetate by pumping it right into the normal butyl storage tanks.

If you're interested in that cent or two—get in touch with your Eastman sales representative.

Eastman
CHEMICAL PRODUCTS, INC.
KINGSPORT, TENNESSEE

Sales representative for TENNESSEE EASTMAN COMPANY, division of EASTMAN KODAK COMPANY

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; New York—260 Madison Ave.; Framingham, Mass.—65 Concord St.; Cleveland—Terminal Tower Bldg.; Chicago—360 N. Michigan Ave.; St. Louis—Continental Bldg.; Houston—412 Main St.; West Coast: Wilson Meyer Co., San Francisco—333 Montgomery St.; Los Angeles—4800 District Blvd.; Portland—520 S. W. Sixth Ave.; Seattle—821 Second Ave.

PENN. INDUSTRIAL

Lawrence Robert O'Rourke has been appointed a sales executive of the Pennsylvania Industrial Chemical Corporation, Clairton, Penna. He will maintain the company's plant in Chester, Pa. He had been associated with Falk & Co. for fifteen years, and is a graduate of Fordham University, New York City. While with Falk, Mr. O'Rourke engaged in production, control, research and sales activities, in their various plants and offices.

L. R. O'Rourke

N.B.S. CHEM. DIV.

Dr. Edmund J. Blau has joined the Organic Coatings Section of the National Bureau of Standards Chemistry Division. Dr. Blau will investigate the drying process in paint and related films and the physical and chemical changes occuring during film formations.

SEARS, ROEBUCK

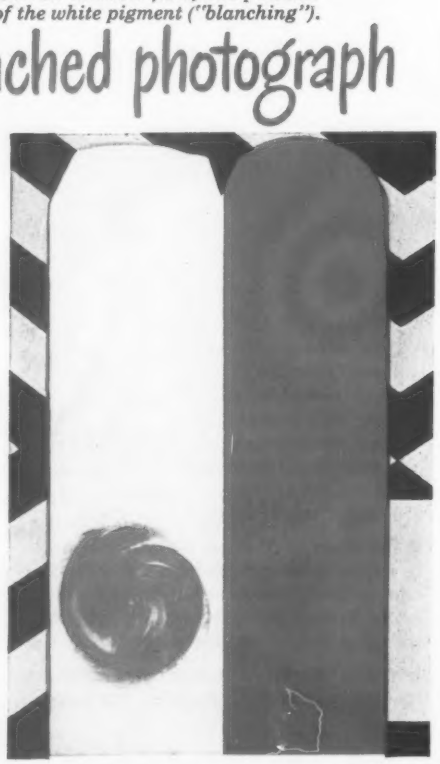
Hamilton H. Roberts has joined the Central Laboratory. He will work with George A. Nichols, technical director, in the research and development of product finishes and will assist the sales department on technical terms. Mr. Roberts was formerly with the J. C. Osborn Company.

TENLO-70

eliminates "blanching" in odorless flats*

Tenlo-70 wets-out **all** *the pigment. In odorless flats, this prevents selective flooding of a portion of the white pigment ("blanching").*

Here's a retouched photograph that doesn't prove a thing!



These are sample-strips of a typical odorless flat wall. The sample on the right was ground with 8 pounds of Tenlo-70 per 100 gallons.

The control strip (left) is masked by a white pigment float. Rubbing has developed a spot of true color.

The uniform true color of the Tenlo-treated sample is not affected by rubbing, showing that the pigment float has been eliminated.

In *your* finished paint this means a product that can be lapped and patched. Sags and runs can be picked-up in partially-set films without giving a streaked appearance.

Although this photograph *shows* what Tenlo-70 can do for your odorless flats, it doesn't *prove* anything. The only way to prove the effectiveness of Tenlo-70 is to use it in your own formulation.

Get all the facts on Tenlo-70. Write today for free illustrated folder.

GRIFFIN CHEMICAL COMPANY

1000 16th STREET, SAN FRANCISCO 7, CALIFORNIA

Los Angeles **Plant: Richmond, California**

***Control of "blanching" is only one of the advantages of Tenlo-70. It also retards skinning and controls hard settling. This can eliminate the need for anti-skinning and bodying agents.**

W. P. FULLER

C. E. Freeman, former manager of the Salt Lake City, Utah, district, has been appointed manager of the Puget Sound district. He succeeds **Byron W. Butler,** who has been given an administrative position at the firm's home offices in San Francisco.

C. E. Ide, formerly manager of the Arizona district, will take over Mr. Freeman's position at Salt Lake City. **Paul G. Loynd** succeeds Mr. Ide as Arizona district manager. Mr. Loynd was paint sales manager in Portland, Ore.

J. P. Fraser has been named Portland, Ore., paint sales manager. He held the corresponding post in the San Diego branch. Mr. Fraser is succeeded at San Diego by **Norman Hahn,** who was corporation salesman in Los Angeles.

G. B. Lee has been named general superintendent at the South San Francisco plant, succeeding **D. C. Bennett** who has retired.

PITTSBURGH GLASS

Stuart Brown, Jr., has been appointed divisional manager of the M. B. Suydam Division. He was formerly general manager of the Division.

C. C. Thompson has been named office manager for all of the firm's general office departments. He was most recently credit and office manager of the Columbia-Southern Chemical Corporation.

John H. Beatty has been appointed manager of Pittsburgh Glass' Jackson, Miss., branch. He was formerly glass manager of the Midland, Texas, Branch.

H. B. Weed has been named manager of the Trenton, New Jersey, Branch. He succeeds **R. A. McMullin** who has returned to the Philadelphia Branch to accept a special sales branch.

John Henry Coon, Jr., formerly paint manager at Harrisburg, is filling Mr. Weed's position as manager of the Reading, Pennsylvania, Branch.

Richard A. Bowes has been appointed acting manager of industrial sales of the Milwaukee Paint Division. Succeeding him as industrial sales manager at Houston is **William F. Calhoun, Jr. Carl C. Patterson** will fill Mr. Calhoun's Atlanta position.

HEYDEN CHEMICAL

Ernest G. Kuehn has been elected vice president of the Heyden Export Corporation and appointed manager of the Heyden Chemical Corporation's Export Division. He has been associated with Heyden since 1945. Most recently he was manager of the Latin-American Export Department.

PATENTS

Conducted by

Lancaster, Allwine & Rommel

PATENTS AND COPYRIGHTS

424 Bowen Building,
Washington, D. C.

Complete copies of any patents or trade-mark registration reported below may be obtained by sending 50c for each copy desired to Lancaster, Allwine & Rommel.

Bodied Phenolic Varnish

U. S. Patent 2,636,017. Hyman Schwartzberg, Chicago, Ill., assignor to The Glidden Company, Cleveland, Ohio, a corporation of Ohio.

The method of preparing a coating composition which comprises the steps of: providing a potentially heat-reactive and substantially dehydrated syrup composed essentially of substantially unpolymerized polymethylol compounds of phenolic materials selected from the class consisting of phenol, meta cresol, 3,5 xylenol and mixtures thereof, said polymethylol compounds having a total combined formaldehyde content of between about 2¼ and 3 mols per mol of phenolic material; adding a volatile compatible organic solvent, and an acid catalyst to said syrup to establish a pH of 5 to 6; azeotropically distilling solvent and water from said mass while adding sufficient solvent to the distilling mass to maintain its viscosity below about Z, and so continuing the azeotropic distillation and separation of water until the mass attains a viscosity between A and D, inclusive, when measured therein at a non-volatile-matter level of between 31.6% and 34.6%, inclusive, thereby converting said syrup into a bodied, potentially heat-reactive film-forming material; and adding to the bodied material from 6% to 10% by weight thereof, of an acid accelerator.

Vinyl Interpolymer

U. S. Patent 2,636,024. Robert J. Wolf, Cleveland, Ohio, assignor to The B. F. Goodrich Company, New York, N. Y., a corporation of New York.

A tripolymer made by polymerizing in aqueous emulsion at about 0°C., a monomeric mixture consisting of from 15 to 80% by weight of vinyl chloride, from 10 to 30% by weight of vinyl acetate, and from 5 to 35% of 2-ethylhexyl acrylate.

Brightening, Passivating Solution

U. S. Patent 2,634,224. Armand W. Faucher, West Hartford, Conn., assignor to Underwood Corporation, New York, N. Y., a corporation of Delaware.

A solution for use in brightening and passivating the surface of zinc or cadmium articles consisting of an aqueous solution composed of 50 to 300 grams of chromic acid per liter of solution, 3 to 24 grams of sulphuric acid per liter of solution, 25 to 66% as much orthophosphoric acid as sulphuric acid, and sufficient nitric acid to prevent the surface from streaking.

Stain Filler

U. S. Patent 2,635,087. George L. Denisston, Dayton, Ohio, assignor to Chadeloid Corporation, Dayton, Ohio, a corporation of Delaware.

A combined wood stain and filler in the form of a solution-suspension consisting of diethylene glycol monomethyl ether, acid organic dyestuff dissolved in said ether, an air drying resin selected from the group consisting of phthalic anhydride-glycerol resin and urea-formaldehyde resin in solution in said solvent base, a hydrated precipitated calcium silicate and polyvinyl alcohol.

Plasticized Polyvinyl Chloride

U. S. Patent 2,634,248. Joachim Dazzi, Dayton, Ohio, assignor to Monsanto Chemical Company, St. Louis, Mo., a corporation of Delaware.

A plasticized vinyl chloride resin which comprises a polymer of at least about 70 percent of vinyl chloride and up to about 30 percent of a copolymerizable monomer, containing intimately dispersed therein from five to 50 percent by weight, based on the plasticized composition of a dialkyl ester of biphenyldicarboxylic acid wherein the alkyl radicals contain from four to ten carbon atoms.

Halogen-Containing Resins

U. S. Patent 2,636,874. Robert A. Gregg, Passaic, N. J., assignor to United States Rubber Company, New York, N. Y., a corporation of New Jersey.

A soluble, fusible, unsaturated, halogen containing resin which is the polymerized reaction product of (A) a monomeric 2-alkenoxyalkyl ester of an alpha-ethylenic carboxylic acid, wherein the 2-alkenoxyalkyl group is the radical of 2-alkenoxyalkanol of the formula

$RCH=CR-CH_2-O-CHR'-CHR'-OH$

where one R is hydrogen, and the other is a radical selected from the group consisting of hydrogen, chlorine, methyl, ethyl, and phenyl, and R′ is a radical selected from the group consisting of hydrogen and alkyl, and (B) from 5 to 250 percent by weight, based on the weight of said ester, of a bromomethane compound of the general formula $BrCX_3$ where the X's are selected from the group consisting of hydrogen, bromine and chlorine, at least two of the X's being halogen.

Protein Emulsion Coating

U. S. Patent 2,636,829. Richard G. Smith, Harvey, and Carl S. Vestling, Urbana, Ill., assignors to Sherwin-Williams Company, Cleveland, Ohio, a corporation of Ohio.

An oil-in-water emulsion coating composition comprising essentially an aqueous alkaline continuous phase in which is dissolved a protein soluble in aqueous alkaline solutions but insoluble in glycerine, said protein comprising casein, a discontinuous oil phase capable of forming a solid film when the emulsion is applied as a coating to a surface and dried aerobically, and a quantity of a quinone effective to increase the wash fastness of the resulting coating.

MICA
WATERGROUND AND MICRO
for HOUSE PAINTS
Also PRIMERS and SEALERS
Mica eliminates checking and cracking, produces better adhesion, increased body, and less penetration. It increases moisture resistance, provides mild chalking with less erosion.
The English Mica Co.
STERLING BUILDING
STAMFORD, CONN.

The PROTECTION of ALUMINUM

Drawing courtesy of Piasecki Helicopter Corporation, Morton, Pennsylvania

THE H-21 Piasecki Tandem Helicopter—the "Work Horse"—is ideally suited for rescue work in areas inaccessible by other means, and in all kinds of rough weather.

For durable paint adhesion and high corrosion-resistance aluminum parts of the "Work Horse" are Alodized. The "Alodine" protective coating chemical bonds paint, extends paint life, and protects unpainted aluminum.

Because of its economy, effectiveness, and ease of application, the Alodizing process is finding wide-spread use in the aircraft field and in other industries fabricating products of aluminum.

Alodized aluminum meets the requirements of Military Specification MIL-C-5541. Write or call for coating and process data on "Alodine".

"Alodine" Trade Mark Reg. U. S. Pat. Off.

CHEMICALS ACP PROCESSES

AMERICAN CHEMICAL PAINT COMPANY

General Offices:

AMBLER, PENNSYLVANIA

Detroit, Mich. ***Niles, Calif.*** ***Windsor, Ont.***

CALENDAR OF EVENTS

Aug. 20-21. 33rd Annual Convention of American Soybean Ass'n., Jefferson Hotel, St. Louis, Mo.

Sept. 6-11. ACS Fall Meeting, Chicago, Ill.

Oct. 26-28. 65th Annual Meeting of National Paint, Varnish and Lacquer Ass'n., Chalfonte-Haddon Hall, Atlantic City, N. J.

Oct. 29-31. 31st Annual Meeting of the Federation of Paint and Varnish Production Clubs, Chalfonte-Haddon Hall, Atlantic City, N. J.

Production Club Meetings

Baltimore, 2nd Friday, Park Plaza Hotel.

Chicago, 1st Monday, Furniture Mart.

C.D.I.C., 2nd Monday.
Cincinnati — Oct., Dec., Mar., May, Hotel Alms.
Dayton — Nov., Feb., April, Suttmillers.
Indianapolis — Sept., Claypoll Hotel.
Columbus — Jan., June, Fort Hayes Hotel.

Cleveland, 3rd Friday, Harvey Restaurant.

Dallas, 2nd Thursday, No Fixed Place.

Detroit, 4th Tuesday, Rackham Building.

Golden Gate, Last Monday, El Jardin Restaurant, San Francisco.

Houston, 2nd Tuesday, Seven Seas Restaurant.

Kansas City, 2nd Wednesday, Pickwick Hotel.

Los Angeles, 2nd Wednesday, Scully's Cafe.

Louisville, 3rd Wednesday, Seelbach Hotel.

Montreal, 1st Wednesday, Queen's Hotel.

New England, 3rd Thursday, Puritan Hotel, Boston.

New York, 1st Thursday, Building Trades Employers Assn.

Northwestern, 1st Friday, St. Paul Town and Country Club.

Pacific Northwest, Annual Meetings only.

Philadelphia, 3rd Wednesday, Engineer's Club.

Pittsburgh, 1st Monday, Fort Pitt Hotel.

St. Louis, 3rd Tuesday, Forest Park Hotel.

Southern, Annual Meetings Only.

Toronto, 3rd Monday, Diana Sweets, Ltd.

Western New York, 1st Monday, 40-8 Club, Buffalo.

Pigment Dispersion in Water

U. S. Patent 2,637,111. Laszlo Auer, South Orange, N. J.

Dispersion of a by nature hydrophobic pigment in water, comprising (1) a water-and-pigment mixture component and (2) a dispersing agent component, said water-and-pigment mixture component consisting of 14% to 35% of hydrophobic organic pigment and 65% to 86% of water, and said dispersing agent component comprising a water soluble fatty alcohol sulfate, which is a member of the class consisting of salts of sulfates of lauryl alcohol, cetyl alcohol and oleyl alcohol, said dispersing agent component being used in proportions of 9% to 20% of fatty alcohol sulfate, based on the dry pigment content, said dispersing agent being in solution in said water and said pigment being in direct contact with said solution.

An oil-in-water resin emulsion pigment color concentrate comprising the dispersion of claim 18.

Allyl Esters

U. S. Patent 2,639,273. Charles W. Gould, Wilmington, Del., assignor to Hercules Powder Company, Wilmington, Del.

The process of copolymerizing an allylic ester of a stabilized rosin acid with an unsaturated compound containing a single ethylenic linkage as the only nonbenzenoid carbon to carbon unsaturation which comprises heating a mixture of the two monomers in the presence of a peroxidic polymerization catalyst.

Vinyl Copolymer

U. S. Patent 2,636,023. Paul John Culhane, Wilmington, Del., and George Moore Rothrock, Kenmore, N. Y., assignors to E. I. du Pont de Nemours & Company, Wilmington, Del., a corporation of Delaware.

An acetone-soluble copolymer of vinyl chloride, acrylonitrile and vinyl pyridine containing 45% to 80% by weight of vinyl chloride, 10% to 45% of acrylonitrile and 2% to 10% of a vinyl pyridine.

Wood Preservation

U. S. Patent 2,637,691. Estes E. Pershall, Hazelwood, Mo., assignor to T. J. Moss Tie Company, St. Louis, Mo., a corporation of Missouri.

A treating solution for rendering wood fire-resistant before and after leaching with water comprising an ammoniacal solution of an ammoniated basic zinc chloride having a composition on the dry basis between approximately

$$.2ZnO:1ZnCl_2:2NH_3$$

and $4ZnO:1ZnCl_2:2NH_3$.

Wood which is fire-resistant before and after leaching with water comprising the product resulting from the impregnation and drying of wood with an ammoniacal solution of an ammoniated basic zinc chloride having a composition on the dry basis between approximately

$$.2ZnO:1ZnCl_2:2NH_3$$

and approximately $4ZnO:1ZnCl_2:2NH_3$

Water Dispersible Alkyd

U. S. Patent 2,634,245. Rudolph P. Arndt, Milwaukee, Wis., assignor to Pittsburgh Plate Glass Company, Allegheny County, Pa., a corporation of Pennsylvania.

In a process of preparing a water dispersible resin, the steps comprising admixing a drying glyceride oil modified glyceryl phthalate resin with polyethylene glycol and heating the mixture until said water dispersible vehicle is obtained.

LANCASTER, ALLWINE & ROMMEL
REGISTERED PATENT ATTORNEYS

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Suite 424, 815 — 15th St., N.W.
Washington 5, D. C.
Patent Practice before U. S. Patent Office. Validity and Infringements Investigations and Opinions.
Booklet and form "Evidence of Conception" forwarded upon request.

DICALITE PRODUCTS

FILTERAIDS

Dicalite provides high flow-rates and brilliant clarity of filtrate for a wide range of liquids in nearly every branch of industry.

Dicalite Superaid	Dicalite CP-5
Dicalite 115	Dicalite Speedex
Dicalite UF	Dicalite 2500
Dicalite Speedflow	Dicalite 4200
Dicalite Special Speedflow	Dicalite ELX
Dicalite Speedplus	Dicalite 211

FILLERS

A wide range of Dicalite Fillers serve the differing needs of a long list of industries, from building materials through dyes, plastics, paper, paint, textiles, and many others.

EXTENDERS AND FLATTING AGENTS

Dicalite materials are widely used as extenders and flatting agents in both inside and outside paints, varnishes, enamels and lacquers. They produce flatting to any desired degree and generally improve adhesion, drying, durability and color dispersion.

Write Dicalite Division—Dept B-5-614 South Flower Street, Los Angeles 17, California, for information on how Dicalite can serve you.

Your Dicalite Engineer can bring light into your processing problems

While your Dicalite Engineer may be somewhat surprised at being called a searchlight, that is his job, essentially — to throw light on operating difficulties and clear them away. His intimate, detailed knowledge of diatomaceous materials and his wide experience in their applications will often solve an operating problem quickly. But, if necessary, he'll spend days working with you and your operators, ironing out difficulties or perhaps, aiding you in working out details for a projected new process.

Whether your problems involve filtration, fillers or any other use of diatomaceous silica, his expert services are always at your call. For extremely complex problems, you can call on the services of the fully-equipped Dicalite laboratories, who will spend weeks if necessary to get you the right answer.

Our crowded files of years past show how great the value of Dicalite Engineering Service is — to you and to us, also. For we are as interested as you in seeing to it that, when you get Dicalite, you get the *results* you want!

Dependable GREAT LAKES Dicalite® DIATOMACEOUS MATERIALS

DICALITE DIVISION, GREAT LAKES CARBON CORPORATION • NEW YORK 17 • CHICAGO 1 • LOS ANGELES 17

abstracts

De-Rusting and Cold-Phosphating Of Iron Surfaces

Bigeon, J., Peintures, Pigments, Vernis, 27 (1951), pp 167-169

In order to protect iron and steel surfaces against subsequent under-rusting before painting J. Bigeon recommends to remove even the slightest traces of iron oxide. If the iron surfaces are derusted by the usual chemical or/and physical methods, treatment with a solution of phosphoric acid (64% H_3PO_4 = 45°Be) diluted to 25 percent. or with other efficient phosphoric acid preparations is bound to remove every trace of oxide and to increase the weathering resistance of the paint films appreciably.

If these phosphoric acid preparations are brushed on cold, they rapidly form a fast drying film of iron phosphate wherever the iron surface is covered with rust, while on bright surface areas they remain wet and are not rapidly changed into the phosphate. Indeed, this reaction may continue even after application of the paint, inducing faulty adhesion of the superimposed paint films.

Cold-phosphating can be rendered considerably easier and safer if the phosphoric acid preparations are partly neutralized by some organic base. Suitable substances for this purpose are guanyl urea compounds which also represent rather effective corrosion inhibitors. J. Bigeon recommends the use of guanyl urea phosphate (molecular weight:200; melting point:185-188 degrees Centigrade; degree of solubility in water:10.3 percent at a temperature of 25 degrees Centigrade). A 5-percent. solution of this compound forms a reliable anti-rusting agent for iron and steel surfaces if these are dipped into the solution for about five minutes. The rust is removed entirely, leaving an adherent grayish-black coating which can be painted over as soon as completely dry, forming a perfect protection against any possible under-rusting effects.

Similar results can, according to J. Bigeon, be obtained with a compound which at a molecular weight of 253 contains 27 percent of phosphoric acid and 4 percent of organic nitrogen. It forms a dark brown viscous solution (temperature of this substance are claimed to be equal to those of guanyl urea phosphate at much lower concentrations.

Fungi Attack on Paint Films

Meier, K., Schmidt, H., Deutsche Farben-Zeitung, 6 (1952), 87-92.

The two authors studied the various types of fungi in question, the degree of sensitiveness of various vehicles to fungi attack, the influence of the chief pigments and pigment groups and the efficiency of suitable toxic additions (fungicides). The types of fungi most liable to attack paint and varnish films are the higher fungi, or eumycetes, belonging to the group of thallophytae. Most of the fungi of this group growing on paint and varnish films belong to the class of the ascomycetes.

The studies of the authors were centered on the blue paint films on a garden fence and on brick walls covered with yellow paint films.

The fungi growing on paint and varnish films obtain the nourishment necessary to their existence and propagation from the vehicle substance within the paint films themselves, from the surface (wood) or from exterior sources of nourishment beyond the sphere of the paint films proper. Humid warmth is particularly conducive to fungi growth.

Meier and Schmidt studied fungi growth on numerous types of vehicles, such as, for instance, dextrine, phenol and alkyd resins, methyl cellulose, nitrocellulose, linseed oil, urea resins, asphalt, polyvinyl acetate, chlorinated rubber, wood oil and shellac, the rate of fungi growth decreasing in the order of vehicles enumerated above.

The influence of pigments was tested only in connection with linseed oil containing 2 percent of the pigments selected.

The checking effect of the pigments on fungi growth increases in the following order:- chromium oxide green, chalk, heavy spar, white lead, red iron oxide, chrome yellow, cadmium yellow, zinc white, red lead and titanium dioxide. Thus, while under the condition of the tests selected, titanium dioxide exerts the most pronounced checking effect on fungi growth, it was found that all pigments exert a certain checking influence and that fungi growth on pure vehicle films is most pronounced in all instances. Fungi growth lowers the hardness, adhesion and elasticity of all paint and varnish films and decreases their degree of solubility in alkalies.

The tests of the toxic influence of fungicides include additions of sodium silico-fluoride, zinc chloride, benzoic acid, salicylic acid, p-chlorobenzoic acid and phenol in amounts of from 0.2 to 2 percent in linseed oil. The toxic effect of these fungicides increases in the order mentioned, but in selecting them for any particular purpose, attention must also be paid to their influence on the drying capacities and the water resistance of the paint and varnish films.

Measuring Film Thickness With Beta-Rays

Trost, A., Berthold, R., Chemie-Ing. Technik, 24 (1952) p. 163

Among the papers offered at a Special Meeting on non-destructive testing methods, some information was presented on the measuring of film thicknesses by means of beta-isotopes. According to A. Trost these measurements require a distribution of energy of the beta-rays over a wide range of spectrum. A suitable radiator for thin varnish and lacquer foils is thallium with beta-particles of a maximum energy of 0.87 MeV.

Strontium exhibits a still higher maximum energy (1.5 MeV). The indication of radiation is chiefly effected by means of an ionization chamber. In one special type of these chambers, the air within one half of the chamber is ionized by a calibrating preparation, the air within the other half by the radiation penetrating the sample. The measuring accuracy amounts to 1 percent within the range of 0.001 to 1 mm film thickness.

Discoloration of Brass Coated With Lacquer

Stock, E., Junker, E., Deutsche Farben-Zeitschrift 6 (1952) pp. 14-18.

The authors conducted experiments with brass strips, 12 x cm, inserted for six weeks in various thinners as well as in solutions of guncotton, natural and synthetic resins contained in closed glass vessels. All these substances were tested for pH-values.

These experiments yielded the following conclusions:-

Discoloration of brass surfaces by the substances tested can be avoided if these are rendered indifferent and

stable. Discolorations are chiefly caused by substances exhibiting pH-values below 7 and by water contents. The following solvents and plasticizers were found to be unsuitable:- Butyl acetate, the solvents amyl alcohol, oil of terpentine, methyl glycol, carbon bisulphide, tricresyl phosphate, the plasticizers: butyl stearate, triacetine, methyl acetate.

The resins used must be neutral. It is also necessary to employ suitable lacquers. Metal lacquers should be provided with a suitable stabilizer.

Testing Anti-Corrosion Properties of Paints

Bacskai, G., Kovacs, K., Hungarian Journal of Chemistry, 4.2. (1952).

Rusting of iron surfaces is an electrochemical process induced by local currents. The primary reaction of this process is the solution of bivalent iron and its hydrolysis to ferrous hydroxide, while the second and purely chemical phase consists of the oxidation of ferrous hydroxide to the ferric state. The paint applied to a metallic surface serves two chief purposes: 1. Isolation of the metal against exterior corrosion agents and the reduction to a minimum of the diffusion of these agents through the paint film to the metallic surface. 2. Elimination or diminution of the corrosive attack by passivation of the metallic surface by means of one or more effective additions to the paint mixtures. The potential relation of active and passivated iron surfaces were studied by determining the potential time curves for numerous polished iron strips submerged in various active solutions. These experiments proved that the anti-rusting effect of the coatings can be reliably evaluated and defined. The basis of evaluation is the relation of the curves obtained to the "limit of passivation".

High Temperature Resistance Of Paints and Pigments

Anon, Rev, & Prot. 4 (1951), 106

Carbon black, graphite, barium sulfate, etc. are still stable at temperatures of about 540 degrees Centigrade. Lithopone, zinc oxide, titanium dioxide, etc. in paints remain stable at temperatures of up to 250 to 500 degrees Centigrade, iron oxide, chrome yellow, etc. at temperatures of up to 150 to 300 degrees Centigrade. Chrome green, iron ochre, Berlin blue, etc. in paints can be safely exposed to temperatures of 100 to 250 degrees Centigrade. Linseed oil paints change their hue at about 150 degrees Centigrade, phenol-formaldehyde coatings at about 150 degrees Centigrade. Further decomposition after exceeding their respective critical temperatures is chiefly dependent on the oils added.

Similar temperature limits prevail in the case of rosin modified alkyds and cumarone lacquers and varnishes, although the decomposition temperatures range between 425 and 480 degrees Centigrade.

Aluminum powder is satisfactory only up to temperatures of 200 to 250 degrees Centigrade. Aluminum powder mixtures with active silicic acid may however be used at temperatures of up to 280 to 300 degrees Centigrade. Silicone paints are stable up to 500 to 600 degrees Centigrade.

Anti-Corrosive Aluminum Paints

Mueller, A., Osterreichische Chemiker-Zeitung, 57 (1951), 165-168

According to A. Mueller, the optimum composition of aluminum paints in Austrian practice includes at least 20 to 25 percent aluminum and not more than 40 to 45 percent of total volatile substances. Suitable driers are cobalt and manganese compounds. The durability of high grade aluminum coatings should considerably exceed that of the standard anti-rusting paints containing zinc oxide and titanium dioxide, lead oxide, lead chromate and zinc chromate for the following reasons:- 1. The floating and mirror-forming capacity of the aluminum flakes covered with stearate films. 2. Their non-transparency (opacity) and fish scale arrangement within the topmost layers of the films. 3. The level shape of the aluminum scales. 4. The high degree of light and heat reflection exerted. Mean reflection 70 percent.) 5. Aluminum paint films are easily cleaned. 6. The specific weight is 1.05, as against 1.70 for normal anti-rusting paints. It is possible to cover 16 sq. m. of sur-

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face with 1 kg. of aluminum paint (about 160 sq. ft. with 2.2 lbs. of paint)

Thermal Isomerization of Rosin

Stinson, J. S.; and Lawrence, Ray V. Naval Stores Research Division, Naval Stores Station, Bureau of Agricultural and Industrial Chemistry, United States Department of Agriculture, Olustee, Fla. Presented at ACS, Div. of Paint, Plastics, and Printing Ink Chemistry, March 15-19, 1953, at Los Angeles, Calif.

Much of the rosin consumed in this country is processed at temperatures between 225° and 300° C. For example, in the preparation of ester gums the rosin and glycerol are usually heated at 275° to 290° C. for 6 to 10 hours. In order to differentiate between those changes taking place in the rosin due to the heat treatment alone, and those changes caused by the reaction of rosin with some added material, a study was made of the effect of temperature on the physical and chemical constants of rosin. Commercial WW gum rosin was heated under an inert atmosphere at 225°, 250°, 275°, and 290° C. Samples of pure slash rosin, pure longleaf rosin, FF wood rosin, and N wood rosin were heated under the same conditions at 275° C. The influence of heating on grade, softening point, acid number, saponification number, and optical rotation was determined. The effect of this heat treatment on the tendency of the rosin to crystallize was observed.

The reactions which take place during heat treatment, such as isomerization, dehydrogenation, anhydride formation, and decarboxylation, are described. Their effects on the physical properties of the rosin are considered. The formation of some dehydroabietic acid and the isomerization of neoabietic acid to *l*-abietic acid are shown by ultraviolet absorption. Ultraviolet absorption curves are given for the original WW gum rosin, pure *l*-abietic acid, and heat-treated rosins.

The interesting cycles of crystallinity and noncrystallinity of the mixture of resin acids are presented.

Removal of Coatings By Adherometer

Brantley, L. Reed; Stabler, Reginald; and Bills, Kenneth, Jr., Occidental College, Los Angeles 41, Calif. Presented at ACS, Div. of Paint, Plastics, and Printing Inks Chemistry, March 15-19, 1953, at Los Angeles, Calif.

Because of advantages of availability and design, the use of the adherometer for adhesion measurements has greatly increased in the past few years. However, the interpretation of the method of removal of the coatings and the effective use of the instrument have caused much concern. A recent study of the ivory knife and the process of removal of organic coatings from surfaces by the adherometer has shown that when the knife is set in position with the advancing face perpendicular to the coated surface and the freshly sharpened edge is firmly pressed into contact with the surface, the edge flexes to form a sloping, leading edge or toe. Thus it appears that the knife removes the coating by means of a wedge-shaped toe which slides under and lifts the coating from the surface rather than by the compression and removal of the coating by the vertical face of the advancing knife. As would be expected because of the nonhomogeneity and softness of the ivory, the toe sometimes fractures and wears away erratically, resulting in unreliable measurements.

The use of metal knives which form more satisfactory toes and are suitable for use with the adherometer is discussed. The design of a mechanical pen recorder attached to the pendulum arm to obtain a permanent record for more careful inspection of stripping force and friction measurements is discussed. Other refinements include a chuck to hold the knife in position to speed up the changing of knives and a motor-driven, precision angle sharpening tool for the knife to replace hand sharpening.

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TECHNICAL Bulletins

BUSINESSMAN'S GUIDE

Booklet offering practical guidance to the small business man planning to build or buy a manufacturing plant has been published by the Small Defense Plants Administration, 1337 E. Street N. W., Washington, D. C. The Publication, titled "One Hundred and Fifty Questions for a Prospective Manufacturer," was prepared by Associate Professor of Small Business, William M. Hoad of the University of Michigan, in cooperation with the SDPA. Booklet may be obtained by sending 20 cents to the Superintendent of Documents, Washington 25, D. C.

INDUSTRIAL CONSTRUCTION

Brochure entitled "The Modular Method For Lower Industrial Construction Costs" has been published by the Ferber Company of Hackensack, N. J. The company refers to it as their "Moduleered" building and explain that all units, and their components are standardized. According to Ferber, research has proved that a modular bay of 30′ x 40′ with a clear height of 15′ provides maximum use, flexibility and economy. Firm also claims "Moduleered" construction is suited for one-story buildings from 10,000 to 500,000 square feet. Copy may be had by writing firm.

WEIGHTS AND MEASURES

Report of the 37th National Conference on Weights and Measures, 1952, is now available for 40 cents upon request from the Government Printing Office Washington 25, D. C. The 105-page booklet with 7 figures and 6 tables was published by the National Bureau of Standards. Included in the literature are reports on weights and measures given by representatives who attended the conference, sponsored by the NBS, this spring.

CONSULTING SERVICES

The Association of Consulting Chemists and Chemicals Engineers, Inc. has just released its 14th edition of Consulting Services.

This 1953 edition has 144 pages and consists of four sections: Classifier, 200 items about Association member activities; Scope Pages, describing each member's qualifications and activities; New Section, has information on rare equipment owned by members, and an Index, listing members and organizations alphabetically and by geographical location.

The inside front and back covers carry excerpts from Code of Ethics and By-Laws respectively.

One copy is free, additional copies of edition are $1 each. Requests must be addressed to the Association at 50 East 41st Street.

ALTITUDE CHAMBERS

Four-page bulletin on its standard line of "Tenneysphere" altitude chambers has been released by Tenney Engineering, Inc., 26 Avenue B, Newark 5, N. J. Publication covers test chambers for simulating altitudes from sea level to about 80,000 feet; temperatures from minus 100 degrees F. to 200 degrees F., and relative humidities from 20 to 90 per cent. Copies may be obtained by writing the company.

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AUTOCLAVES

The Process Equipment Department of Blaw-Knox Company, Pittsburgh 22, Pa., has published a new 48-page catalogue, No. 2413, entitled "Blaw-Knox Autoclaves for Pressure-Temperature Reactions." Publication covers industrial processes made possible by utilization of high temperatures and pressures, safety measures, various heating systems, and materials of construction, types of agitation, stuffing boxes and instrumentation. Copies may be had by writing the company.

BOX HANDLING

"The Logistics of Boxes" is an eight-page booklet illustrating and describing the handling of boxes in load units is available from the Elwell-Parker Electric Company 4205 St. Clair Ave., Cleveland 3, Ohio. Literature contains handling tips receiving and shipping materials in boxes and describes such topics as How To Build Your Transportation Policy, Needless Handling Boosts Production Costs and Where the Biggest Savings Will Be Found. Copies available upon request.

REFLECTION METER

"Photoelectric Reflection Meter" Model 610, designed for measuring diffuse reflection of surfaces as an indication of color or degree of whiteness, is described in new edition of Bulletin No. 605 just issued by the Photovolt Corporation, 95 Madison Ave., New York 16, N. Y. Publication describes instrument, various search units used with it, color tests, and tests on paints and enamels. A price list of all equipment is also contained in bulletin. Copy available upon request.

CORK INSULATION

Bulletin 53-4, giving the composition, application and uses of Witcote †820 Cork Insulation is now available from the Witco Chemical Company. According to publication, Witcote is a cold-application fluid type of material of cork and asbestos insulating fillers and a bituminous base possessing adhesive, waterproofing, and corrosion-proofing qualities. Material is applied by hand-operated spray-guns. For copies write to firm's Pioneer Ashphalt Division, 75 E. Wacker Drive, Chicago 1, Ill.

BAG HANDLING

Bulletin, titled "The Logistics of Bags," is designed to cut costs in handling load units in plants, warehouses, etc.

Literature describes and illustrates the handling cycle from receiving, through processing and shipping. A wide variety of bagged products are used for illustrative purposes.

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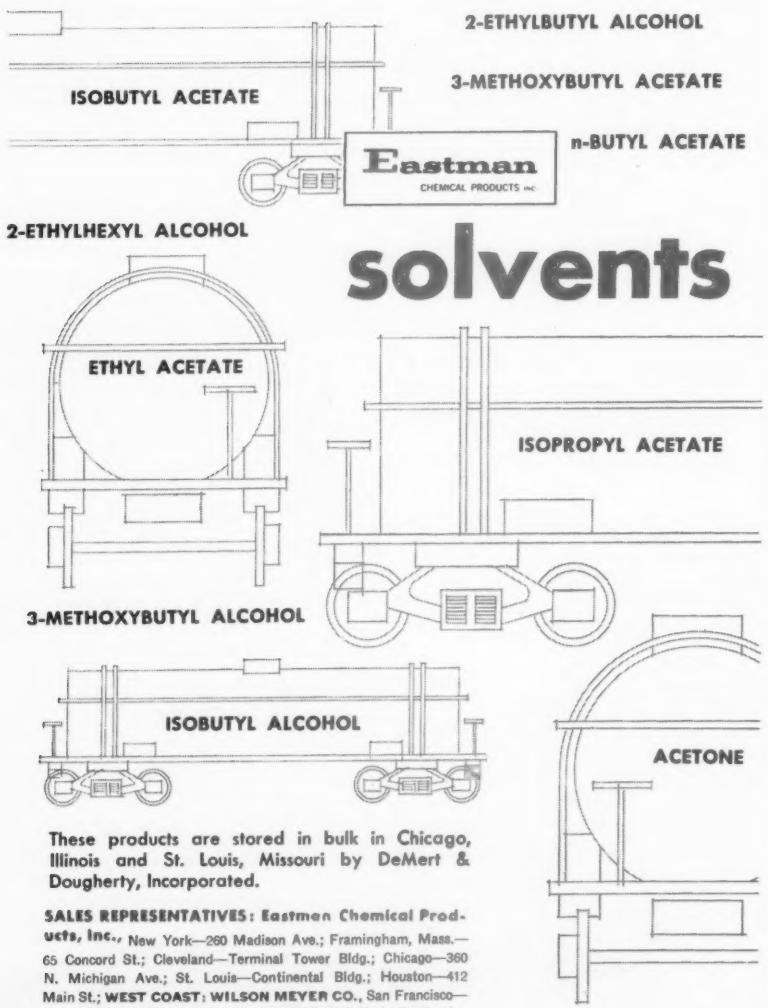
Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, Ohio.

WOOD DISCOLORATION

Technical report about research on ultraviolet-light absorbers which protect wood under lacquer from discoloration is available from the Hercules Powder Company, Wilmington, Del.



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The report points out that if the light color of a piece of furniture is to be preserved under normal room exposure, two conditions must be met: the lacquer must be such that it will not discolor in usage; the wood surface itself under the lacquer finish must be protected from any normal tendency to darken under the action of sunlight entering the room.

Report also gives the results of certain work done in Hercules laboratories relative to the control of the natural darkening of furniture woods under normal usage conditions.

METAL HOSE

Catalog is described as one of the most comprehensive and informative metal hose publications ever printed. Literature contains charts on frictional losses versus flow rates in flexible hose. Feature of catalog is pictorial story on how seamed metal hose is made. Copy of catalog may be obtained by writing Titeflex, Inc., 500 Frelinghuysen Ave., Newark 5, N. J.

PLASTICIZER

Bulletin describing Plastolein 9057 DIOZ (di-iso-octyl azelate), a new monomeric plasticizer is now available. Publication lists specifications, typical characteristics and performance data. For a copy of this booklet or samples of plastolein 9057 DIOZ write to Emery Industries, Inc., Dept. 5, Carew Tower, Cincinnati 2, Ohio.

SORBITOL RESINS

Twenty-page booklet suggests proper uses and formulations for commercial type, oil-modified alkyds and rosin esters produced with sorbitol, a polyhydric alcohol.

Titled "Sorbitol Resins," the booklet presents in tabular form the solids composition, solution composition and properties, air drying data, color retention values, degrees of compatibility, and film properties for six typical alkyd resins compounded with sorbitol; and solid resin and solution properties, solubility and compatibility for six rosin esters.

Copies of the booklet are available from the Industrial Chemicals Department, Atlas Powder Company, Wilmington 99, Del.

Trigg Foundation Grants Four Additional Paint Scholarships

The Board of Trustees of the Ernest T. Trigg Foundation have approved four additional scholarships for the Paint Chemistry Course conducted at the North Dakota School of Agriculture for the 1953-1954 school year.

A total of seven scholarships, each carrying a stipend of $600, have now been granted by the Foundation for the North Dakota College paint course.

Dr. Wouter Bosch, Chairman of the school, will select the students. Applications for the scholarships should be sent directly to him before September and addressed as follows:

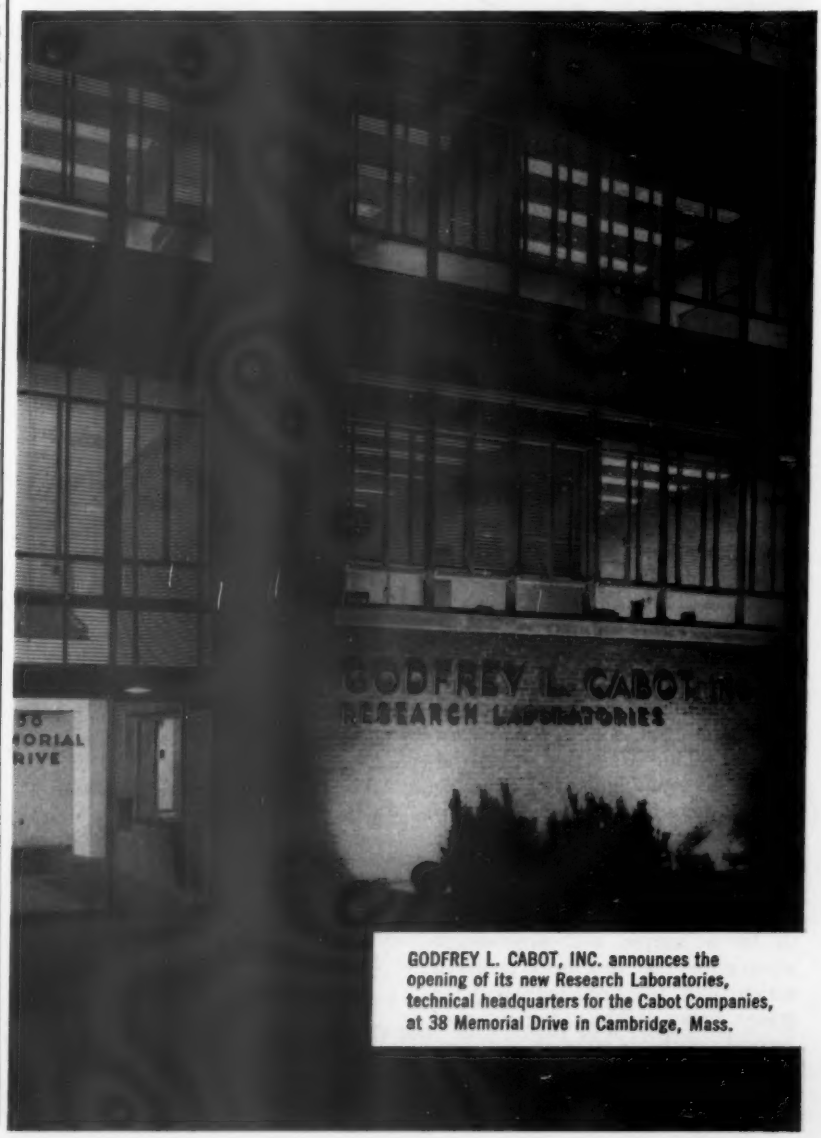
Dr. Wouter Bosch, Chairman North Dakota Agriculture College Fargo, North Dakota.

Fundamental Chemical Research in Europe Increasing, Chemist Says

Fundamental chemical research in Western Europe has greatly recovered in the last few years, according to Dr. Herman Franz Mark, who spoke before a recent meeting of the American Institute of Chemists, New York Chapter held at the Hotel Commodore, New York, N. Y.

The occasion was the Annual Honors Meeting and Dinner, at which the Honor Scroll for 1953 was presented to Dr. Mark famed polymer chemist, and director of the Polymer Research Institute.

Dr. Mark said that most laboratories are well equipped, and well staffed with noted technologists and intelligent, young scientists.



GODFREY L. CABOT, INC. announces the opening of its new Research Laboratories, technical headquarters for the Cabot Companies, at 38 Memorial Drive in Cambridge, Mass.

AEROSOL PAINTS

(*From page 33*)

a resin or resins which were compatible with the liquid propellants at both the low temperatures used in filling and on long storage at room temperature. Other problems such as bubbling, cratering, and orange-peel should also be mentioned.

There were other obstacles aside from formulating the proper paint. Filling equipment used for filling insecticides, deodorants, and like materials was not completely satisfactory for filling paint, and modifications of the equipment were necessary. Proper spray valves had to be developed for use with paints. Finally, through the cooperative effort of the paint manufacturers, the aerosol packagers, the container, valve, and propellant manufacturers, these problems were overcome, and aerosol paints of excellent quality began to appear on the market.

Simultaneously with the work done on pigmented paints or enamels, development work was done by various companies on aerosol pigmented nitrocellulose lacquers, these having the added advantage of fast dry as compared to paints. It was necessary to overcome the same basic problems mentioned above in order to produce suitable aerosol lacquers. This too, was accomplished.

Uses

Although the original merchandizing of aerosol paints was directed toward Mr. and Mrs. Consumer, another market with a great potential soon became apparent. This was the industrial use of aerosol pigmented enamels and lacquers for the spot touch-up of a variety of products, such as home appliances, farm implements, office furniture and equipment, tools, etc. Aerosol paints proved to be a simple and economical answer to the touch-up problem which has plagued industry for many years. Thus the sale of aerosol touch-up enamels and lacquers has grown tremendously the past several years.

Some time ago, the Ordinance Corps of the U. S. Army became interested in aerosol paints and consequently has done a considerable amount of work with them. It recently released a proposed Specification for an aerosol clear acrylic coating intended for use primarily as a protective coating for application to maps, documents, drawings, etc. It is my understanding that to date this is the only Specification released, and the only one to be released for some time to come. However, it is also my understanding that work by the Ordinance Corps is continuing on all types of aerosol paints. Evidently the Ordinance Corps does not feel that there is a non-clogging valve now available which satisfies its stringent requirements. It has provided funds for a research project to develop such a valve. As you can realize, once all requirements are satisfied, the potential market for aerosol paints for the armed forces can be very large.

Although excellent products are on the market today and volume sales are increasing, work must be continued by all concerned to further improve the quality and utility of aerosol paints. Also every means should be used to reduce costs without impairing quality, in order to make the final selling price lower, and thus more attractive to the consumer. If these things are done, aerosol paints are sure to continue to grow in sales volume in the future.

•

Dr. G. L. Cabot Honored at Int'l. Petroleum Exposition in Tulsa

Dr. Godfrey Lowell Cabot, Boston, Mass. named "Grand Old Man of the Natural Gas Industry," was honored at the International Petroleum Exposition in Tulsa, Okla., held May 14-23.

Dr. Cabot, founder and president of Godfrey L. Cabot, Inc., Boston, Mass., world's largest producers of carbon black, was presented with an inscribed gold medal by M. L. Majewski, president of the Great American Oil Company, in a commemorative ceremony held May 17, near the Drake Well replica on the exposition ground.

The 92-year old Cabot head is one of the seven pioneers representing industry divisions selected by the IPE "Old Timers" committee to receive an award, a practice initiated at the 1927 Tulsa Exposition.

Hercules Powder Co. To Cease Rennet Casein Production Aug. 1

The Hercules Powder Company, Wilmington, Del., will cease its production and sale of acid and rennet casein as of August 1.

According to the announcement, Hercules' major interest in casein has always been that of a producer and that domestic milk prices have made it economically impossible to manufacture casein at costs which allow it to be sold in competition with imported casein.

Hercules' casein plants in Elroy, Wis., and in Cambridge and Watertown, Minn., will be closed, officials said.

Robert I. Wishnick Presented Ill. Inst't. of Technology Award

Robert I. Wishnick, president of the Witco Chemical Company and a trustee of the Illinois Institute of Technology, was presented the IIT's Service Award for his work on behalf of the Institute at the recent annual Alumni Reunion Dinner.

Mr. Wishnick, a founder of the Alumni Fund, has served continually on the Special Gift Committee of the Fund, and has served as an alumni counselor on the New Student program.

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LACQUER TENSOMETER

(*From page 32*)

inspection of the film during the test by placing a microscope over the indentation and inspecting the cracks. Another method is to make a series of indentations to different depths which afterwards are inspected. It can then be established between which depths of indentation the cracking has commenced. These methods will, however, as mentioned above never reach the same accuracy as the electrical method.

To obtain uniform and definite test results, a carbon steel plate of a special quality should be used as a base for the paint. This steel plate, which will be supplied on request, is 0.3 mm thick and 80 mm wide and withstands an indentation depth of 8 mm without breaking which is sufficient for the majority of tests. The plate should be stored with care, as it must not show any signs of corrosion. The plate should be thoroughly degreased before use with cellulose thinner or other degreasing agant.

The thickness of the film should not exceed 0.03 mm as in certain cases thicker films will give more variable results. Lacquers which dry by evaporation of the solvent, *e.g.*, nitro-cellulose lacquers, should not be tested earlier than one week (preferably two weeks) after the application. Air-drying oil varnishes should be left to dry at least two weeks, whereas for baking varnishes one or two days will suffice. Test plates which are to be compared should, therefore, be of the same age and have been subjected to the same treatment.

Suitable electrolyte is prepared by dissolving 44 grams of calcium chloride (crystals) and 14 grams of ferro chloride (crystals) in 100 grams of water. If this solution is used the addition of a wetting agent will not as a rule be required. If, however, bad contact between the liquid and the film is suspected owing to variable results on identical test objects, a wetting agent soluble in water may be added.

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